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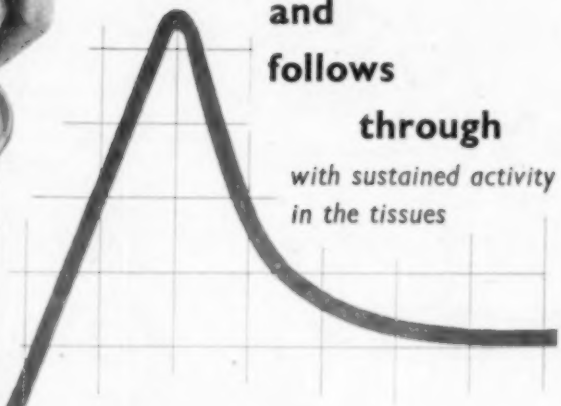

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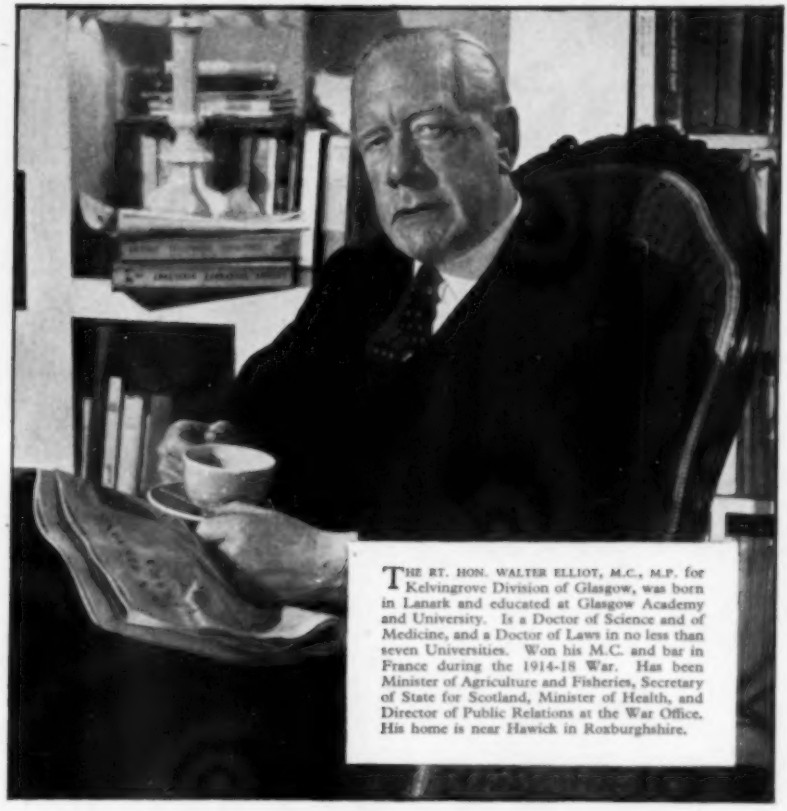

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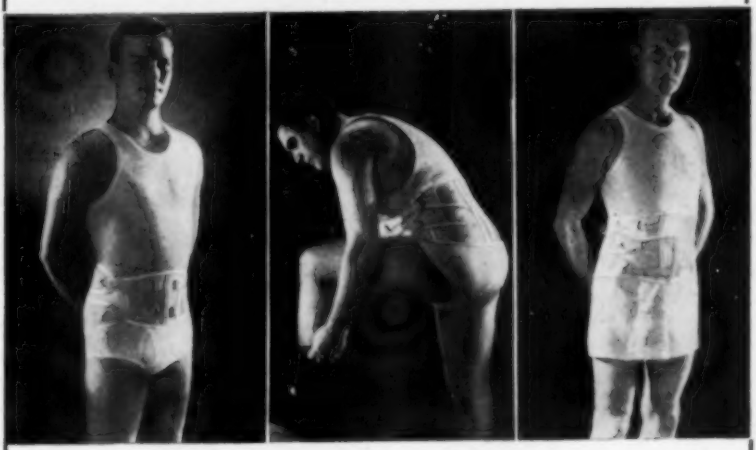

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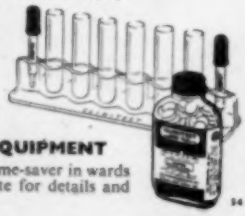

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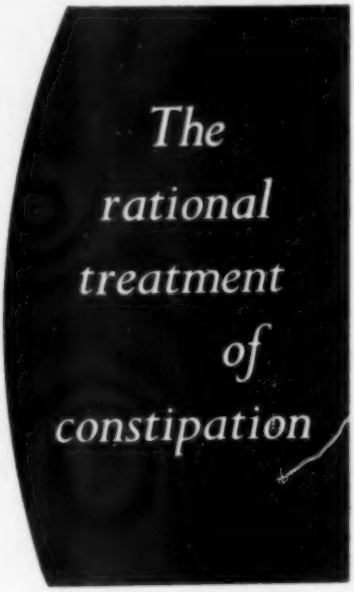

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MERBENTYL

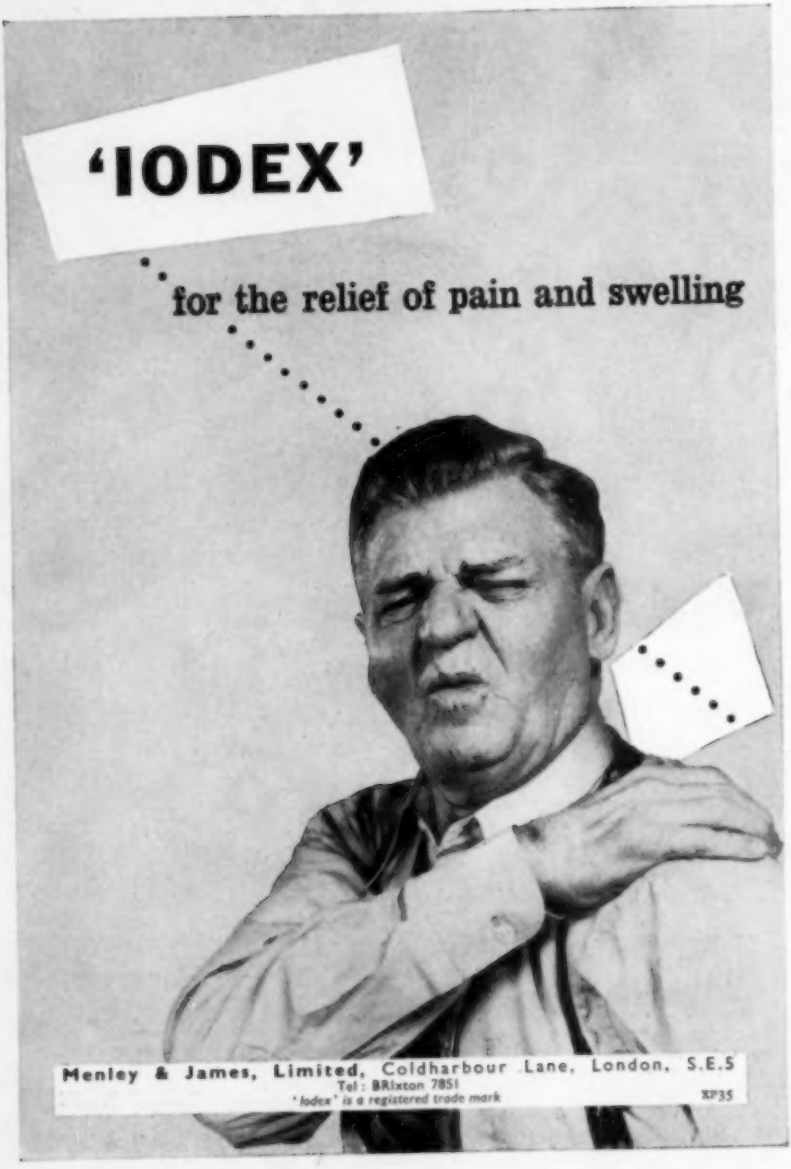
distributed in the United Kingdom & Eire by
BIKER LABORATORIES LIMITED, LOUGHBOROUGH, LEICS.
for the Wm. S. Merrell Company, London.

MERBENTYL *Tablets each containing 10 mg. Diethylamino-carbethoxyphenylbenzyl hydrochloride.*

MERBENTYL WITH PHENOBARBITONE *Tablets each containing 10 mg. Diethylamino-carbethoxyphenylbenzyl hydrochloride and 15 mg. Phenobarbitone.*

Each in bottles of 50 and 250 tablets. The basic N.H.S. cost of treatment is less than 1d. a day.

Merbentyl Plain and Merbentyl with Phenobarbitone (each 5 c.c. containing 15 mg. Phenobarbitone) are also available in Syrup form.


'IODEX'
for the relief of pain and swelling
Menley & James, Limited, Coldharbour Lane, London, S.E.5
Tel: BRixton 7851
'Iodex' is a registered trade mark
XP35

In Coma or **Delirium** — *from* Barbiturates, Narcotics, Alcohol

In Toxicity (with psychoses) — *from* Acute infections e.g. Influenza, Pneumonia

In Psychoses — *from* Prolonged ill-health Multiple operations, Chronic stress

PARENTROVITE

The following are some of the conditions for which PARENTROVITE is being found effective: Acute alcoholic psychoses, including delirium tremens; Coma or delirium from drugs e.g. barbiturates; Collapse after continuous narcosis; Drug withdrawal symptoms; Post-operative confusional psychoses; Psychiatric reactions to prolonged ill-health; Toxic syndrome of and sequelae to influenza and pneumonia.

In all these conditions there is disturbance of intracellular glucose metabolism in the brain calling for massive doses of the VITAMIN B COMPLEX and VITAMIN C given by the most rapid and effective route.

Adequate dosage can be given by *slow intravenous injection* or, diluted with normal saline by *intravenous drip*. Ampoules are also available for *intramuscular injection.*

VITAMINS LIMITED

(DEPT. C.Y. 1) UPPER MALL, LONDON, W.6

NOTES on the formulae, rationale and dosage obtainable on request.

Other Preparations containing the Vitamin B Complex.

Two groups of preparations containing the vitamin B complex in less massive concentration are:

BECOVITE A BEFORTISS. The B complex in Tablets, Ampoules and Elixirs.

A related polyvitamin preparation is

OMNIVITE FORTE. This contains a full range of B vitamins with vitamins, A, D, E and C and supplies the need when these additional vitamins are required. Its principal use has been in the treatment of *alcoholic* addiction as an adjunct to psychiatry.

It is also valuable as a source of vitamins in cases where signs or symptoms suggest an insufficiency.

Gravitational Ulcers and Burns

CIMLAC GAUZE—an impregnated open mesh tulle to counter infection due to Gram-positive and Gram-negative organisms and to assist healing by provision of the amino acid glycine.

The aseptic properties are enhanced by a protective polythene film, easily removed and requiring minimum handling.

FORMULA : *Aminacrin Hydrochlor.*, 0.1%; *Hexylresorcinol*, 0.1% *in a sterilized glycogelatin base.*

PACKS : *Carton containing* 10 *pieces* 3½" × 3½". *Each piece separately heat-sealed and enveloped, with printed instructions for use. Aluminium box containing* 24 *pieces*, 3½" × 3½".

Literature and Samples available on request from the Medical Department

CIMLAC GAUZE

Conforming to the specification for Compound Aminacrine Tulle of the Drug Tariff published by the Ministry of Health

CREWE: *Telephone: Crewe 3251-5*

CALMIC LIMITED

LONDON: *2 Mansfield Street, W.1 Tel.: LANgham 8038-9*

A piece of bibulous paper
should be soaked in cold water
applied to the part to be vesicated
and covered with three or
four folds of dry paper. A
common smoothing iron
heated to 212 degrees
Fahrenheit should now be
passed three or four times
over all, and on removing
the paper the part
found vesicated.

Simplicity

Fortunately for the patient such primitive procedures have passed into oblivion; but the basic principles of counter-irritation still remain. ALGIPAN Balm is the modern physiological outlet for the rubefacient treatment of non-articular rheumatism. Application of this smooth, clean, histamine cream by the patient is *simplicity* itself.

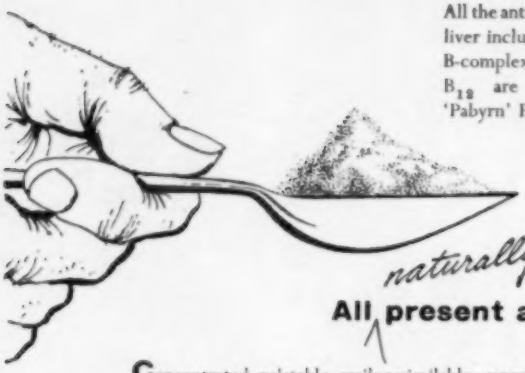
ALGIPAN is non-greasy, will not stain or damage clothes, has no objectionable odour, and is harmless to the most sensitive skin.

Algipan is available in 40 G. tubes. Convenient for the ambulant patient.

Wyeth

JOHN WYETH & BROTHER LIMITED
Clifton House, Euston Rd., London, N.W.1

'Algipan'
Trade Mark
BALM



All the anti-anæmia factors in whole liver including the Vitamins of the B-complex, folic-acid and Vitamin B_{12} are naturally present in 'Pabyrn' Proteolysed Liver.

naturally

All present and correct

Concentrated, palatable, easily assimilable; especially indicated in anæmias refractory to other hæmatinics: also as a high protein supplement. Literature and samples on request.

Pabyrn | **Proteolysed Liver**

PAINES & BYRNE LTD., Greenford, Middlesex

Literature and Professional sample on request.

no dandruff with Seboderm

The finely emulsified lanolin base of SEBODERM ensures non-irritation of the scalp. For simple dandruff a single weekly treatment is sufficient, and for seborrhoeic dermatitis treatment on alternate nights until improvement is noted is suggested.

SEBODERM

CETRIMIDE SHAMPOO

*

SEBODERM contains 15.6% of cetrimide, the quaternary ammonium compound specifically recommended for treatment of seborrhoeic dermatitis.

Brit. Med. J., 2 (1951) 1070

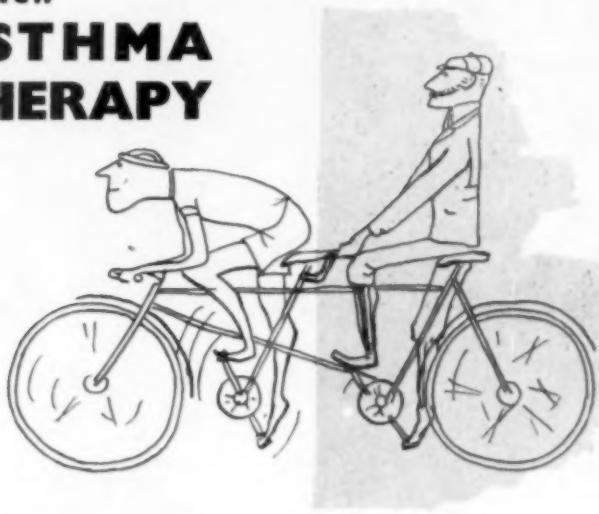
Available in ½-oz. tubes.

PL

PRIORY LABORATORIES LTD., PYRAMID WORKS, WEST DRAYTON, MIDDLESEX

A New

ASTHMA THERAPY



SPEEDY AND LONG LASTING ACTION COMBINED

The "two-phase" therapy provided by ISO-BRONCHISAN sets new standards of efficiency in asthma control. Outer layer of the tablets consists of Isopropyl-Nor-Adrenaline—a potent bronchodilator well absorbed by the sublingual route. When the tablet is placed under the tongue, this layer dissolves and symptoms are *promptly* relieved. Swallowing of the tablet's nucleus presents its content of Ephedrine and Theophylline for slow absorption by the alimentary route—so maintaining and *prolonging* the antispasmodic action on the bronchial smooth muscle.

Each tablet contains Isopropyl-Nor-Adrenaline (Isoprenaline) sulphate gr. ½; Ephedrine hydrochlor gr. 2/5; Theophylline gr. 2. In tubes of 20 tablets and bottles of 100 tablets.

SILTEN

ISO - BRONCHISAN

Prescribable on Form E.C. 10

Silten Limited • Silten House • Hatfield • Herts • England

the tablet **that works to a time-table . . .**

Outer shell
Pentobarbitone sodium B.P. 90 mg.
Action rapid; duration 3 hours

with

Enteric coated inner core
Butobarbitone B.P.C. 60 mg.
Action begins after 2½ hours; duration 5 hours

Bidormal is an effective hypnotic with a two-phase action. It contains a rapid short-acting barbiturate, together with an intermediate-acting barbiturate that has a carefully timed delayed action. Bidormal thus provides a unique and effective means of maintaining calm uninterrupted sleep throughout a complete night of 8 hours. Its lack of residual hangover, drowsiness or "drugged" feeling enables the patient to set about his daily tasks next morning with no diminution of mental acuity and no feeling of drug dependence.

another new A & H product

BIDORMAL

Supplied in bottles of 25 tablets.

ALLEN & HANBURYS LTD. LONDON, E.2

Optimum Nutrition

Although severe malnutrition is now seldom seen in this country there are undoubtedly certain groups whose nutritional standard is low and whose general health could be improved with a better diet.

The protective foods are more often neglected than the other foods by those whose diet is not based on sound principles. Marmite, a protective food supplying the B_2 vitamins, is a concentrated yeast extract which is economical as a dietary source of these vitamins.

MARMITE

yeast extract

Literature on request

contains
RIBOFLAVIN (vitamin B_2) 1·5 mg. per oz.
NIACIN (nicotinic acid) 16·5 mg. per oz.

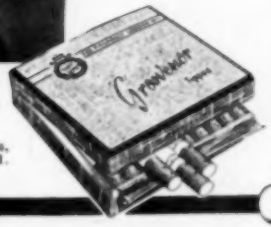
Obtainable from chemists and grocers
Special terms for packs for hospitals, welfare centres and schools

1305 THE MARMITE FOOD EXTRACT CO. LTD., 35 Seething Lane, LONDON, E.C.3

"It's a fine change....

. . . to find a cigarette so smooth and satisfying. The pure white plastic fibres of the tip yield more flavour from the fine tobaccos. Try them—and prove that Grosvenor really do

DOUBLE your smoking enjoyment*



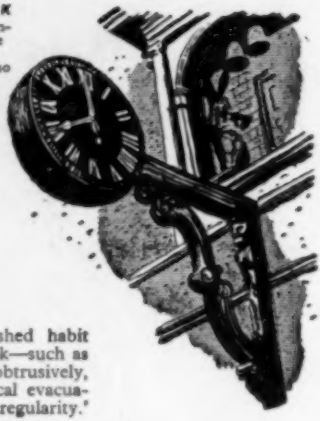
Grosvenor
TIPPED

IN BOXES OF 20 for 3/7 AND
FLAT CARTONS OF 10 for 1/9½

If any difficulty in obtaining Grosvenor Tipped, please write to:
The House of State Express,
210, Piccadilly, London, W.1.

Made by State Express

G.9



ST. DUNSTAN'S CLOCK
On the wall of St. Dunstan-in-the-West in Fleet Street is the first clock showing minutes ever to be made. It was also the first clock to have two dials. It was made in 1671.

CLOCKWORK REGULARITY.

Normal bowel action is a fine thing to possess. It is, perhaps, the most sought after talisman against ill-health in the world. No wonder, then, if its temporary suspension leads from a mild despondency even to black despair. But in such a crisis panic measures are to be avoided—the taking of harsh purgatives eschewed.

Success in the restoration of the much-cherished habit lies in the regular persuasive stimulus of soft bulk—such as is provided by 'PETROLAGAR.' Gently and unobtrusively, 'PETROLAGAR' arranges for normal physiological evacuations and secures the return of 'clockwork regularity.'

Wyeth

JOHN WYETH & BROTHER LTD.
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'PETROLAGAR'
Trade Mark
EMULSION

POSALFILIN

(Podophyllin-Salicylic Acid Compound)

Treatment of

PLANTAR WARTS
VENEREAL WARTS
SEBORRHOEIC WARTS
WARTS ON HANDS

OINTMENT
PACKED IN ½ OZ. TUBES
Prescribable on Form E.C. 10
Further details on request

CAMDEN CHEMICAL CO. LTD.
61 GRAY'S INN ROAD · LONDON, W.C.1

Canal traffic

Far removed from the hustle and bustle of modern life, canal traffic moves slowly but surely towards its destination. Similarly, in the intestinal canal lubricated with Agarol — the smooth bulk moves forward regularly and without strain; the faecal mass is easily evacuated at the end of the journey. The constituents of Agarol establish it as a mild and well-tolerated laxative.

ACTIVE CONSTITUENTS
Agarol Compound is composed of thoroughly emulsified mineral oil in an aqueous agar-agar. Each tablespoonful contains three grains of phenolphthalein.
PACKING: *6 & 14 oz. bottles. For dispensing purposes Agarol is also available in an 80 fl. oz. size at 18/6d. not subject to Purchase Tax on prescription.*

AGAROL

No Warner preparation has ever been advertised to the public.
William R. WARNER & Co. Ltd.,
Power Road, London, W.4.

Unique
in the field

the new
spasmolytic

BUSCOPAN

HYOSCINE-N-BUTYLBROMIDE Regd

FOR ORAL AND PARENTERAL THERAPY

ampoules of 0.02 Gm. • tablets of 0.01 Gm.

Manufactured in England by PFIZER CORPORATION as registered user for
C. H. BOEHRINGER SOHN · INGELHEIM AM RHEIN
(Registered Proprietors of the Trade Mark.)
Distributed by PFIZER LIMITED · FOLKESTONE

Reliability
in delicate Surgery

The THERATOR MINOR
DIATHERMY, Type MME 3

For the most delicate electro-surgery the Therator Minor Diathermy reliably provides two distinct cutting-currents, ideal respectively, for ophthalmic and neuro-surgery. Output is valve-generated, perfect coagulation being assured by careful selection of component values. Current intensity is regulated by a single knob and is repeatable at pre-selected control positions. A *de luxe* set of electrodes and mobile trolley complete the equipment if required. Further information is freely available.

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SPECIALISTS IN:
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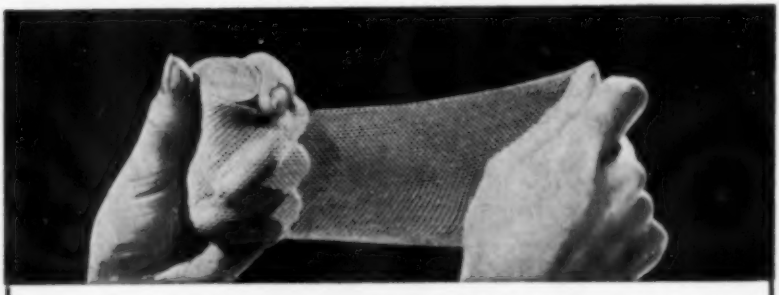

"You will need a Lastonet bandage"

The Lastonet bandage may be prescribed under the National Health Scheme. Its elastic net has a two-way stretch to give firm, even support to sprained or weak joints. At the same time the net allows a healthy degree of ventilation. In 5-yard lengths (fully stretched) and 2½, 3, 3½, 4 or 6 inch widths.

Lastonet
ELASTIC BANDAGE

LASTONET PRODUCTS LTD CARN BREA REDRUTH CORNWALL

9/5

In Rheumatic Disease

Consider

SODIUM GENTISATE

Sodium 2:5-dihydroxybenzoate in tablets containing 0.5 gm.

GABAIL

for maximum tolerance

Sodium Gentisate (Gabail) gives results equivalent to the salicylates in large doses but with complete absence of tinnitus, aural symptoms or gastric irritation, and with no significant increase in prothrombin time or lowering of the alkaline reserve.

Literature and clinical sample available from the distributors

The ANGLO-FRENCH DRUG CO. Ltd

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A NEW ORAL CHEMOTHERAPEUTIC FOR TUBERCULOSIS

A new chemical compound formed by the combination of INH and PAS in molecular proportions.

LITERATURE ON THERAPY AND DOSAGE ON REQUEST

DIPASIC

Tablets of 100 mg. of Isonicotinic acid hydrazide - p - aminosalicylate

BENGUE & CO. LTD.

MANUFACTURING CHEMISTS

MOUNT PLEASANT, ALPERTON, WEMBLEY, MIDDLESEX

for the

treatment or prophylaxis

of

Labyrinthine Disturbances

The value of " Dramamine " in the control of all forms of motion sickness is well established. More than this, however, it is now recognised that " Dramamine " is most effective in the control of other labyrinthine disturbances, so that it is indicated in the treatment or prophylaxis of any condition of abnormal stimuli of the tissues including end organs (gastro-intestinal tract, eyes) and their neural pathways to the labyrinth. Side-effects of " Dramamine " are so slight that dosage may be continued over long periods if necessary.

SEARLE

Dramamine

Brand of dimenhydrinate

Thus conditions in which " Dramamine " has been most effective include vertigo due to hypertension, fenestration procedures and labyrinthitis ; Menière's syndrome, irradiation sickness, and in the symptomatic control of nausea and vomiting due to pregnancy, electro-convulsive therapy, narcotisation and certain drugs (antibiotics, etc.). " Dramamine " may be administered orally or rectally.
It is supplied as 50 mg. tablets, in bottles of 12, 36 and 1,000 and in cartons (10 strips of 10 tablets).

Literature on request

*REGISTERED TRADE MARK

SEARLE

Ethical Pharmaceuticals since 1888

G.D. SEARLE & CO. LTD.

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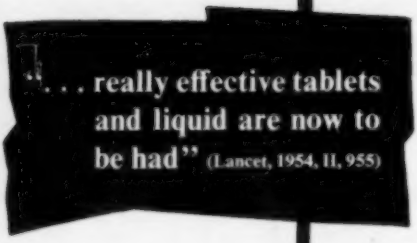
London, W.1.

Telephone : Welbeck 1306.

FERRIC HYDROXIDE for Iron Deficiency



". . . really effective tablets and liquid are now to be had"
(Lancet, 1954, II, 955)

Neo-Ferrum is ferric hydroxide prepared in colloidal form to facilitate rapid and maximal digestion and absorption. It is pleasant to take, does not stain the teeth or cause gastro-intestinal upset, and provides an accurate and balanced administration. Each teaspoonful (or two tablets) contains 0.4g. (6 gr.) iron, equivalent to 2g. (30 gr.) of iron and ammonium citrate.

NEO-FERRUM

TRADE MARK

Basic NHS cost: *Liquid — 6d. per fluid oz.*
Tablets — 4/2d. for 50.

THE CROOKES LABORATORIES LIMITED
PARK ROYAL · LONDON · N.W.10

4-POINT COVERAGE IN

CONGESTIVE HEART FAILURE

Cheyne-Stokes Respiration

Cardiac failure

Bronchospasm

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A CLEAR CASE FOR CARDOPHYLLIN. Best known and most widely used of the purine derivatives, Cardophylin is the one drug which combines *four* methods of treating heart failure. It is a respiratory stimulant; it controls bronchospasm; it increases coronary flow; and it is a diuretic.

IT IS PRESENTED in tablets, suppositories, and ampoules for intravenous and intramuscular administration.

FULLY DESCRIPTIVE LITERATURE is available and a Technical Information Service is always at your disposal.

A clear case for *Cardophylin*

THEOPHYLLINE-ETHYLENE-DIAMINE Trade Mark

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Manufactured by WHIFFEN & SONS LIMITED and distributed by

BENGER LABORATORIES LIMITED · HOLMES CHAPEL · CHESHIRE

A BENGER PRODUCT

LOCAL ANAESTHESIA

INFILTRATION ANAESTHESIA demands a satisfactory spread of anaesthetic solution. It is especially valuable in the outpatient department in cases where general anaesthesia is contra-indicated.

A CLEAR CASE FOR HYALASE, the enzyme hyaluronidase.

HYALASE greatly enhances the spread and absorption of the anaesthetic. It can be easily combined with the local anaesthetic with or without adrenaline, producing a greater area of anaesthesia of satisfactory duration.

HYALASE can be successfully applied whenever infiltration anaesthesia is the method of choice.

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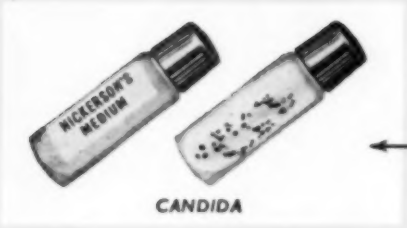
Diagnosis without doubt... a simple consulting room aid to the diagnosis of

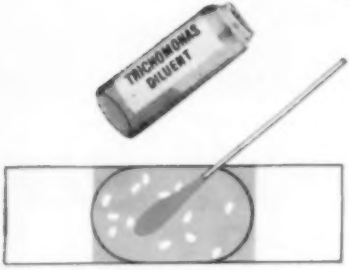


CANDIDA

MONILIA

or

TRICHOMONAS



T. VAGINALIS

Packaging:

- DIAGNOSTIC SET containing one vial Nickerson's Medium and one vial Trichomonas Diluent for single application
- NICKERSON'S MEDIUM: six vial diagnostic package for Candidiasis
- TRICHOMONAS DILUENT: twelve ampoule diagnostic package for Trichmoniasis

LITERATURE ON REQUEST

Ortho

Ortho Pharmaceutical Limited · High Wycombe · England

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—the Energen Dietary Service can give *immediate* advice and help. Special diets for individual cases can be prepared or standard diet cards for common ailments—replaceable as required—are available in an indexed filing box (as shown here). Personal consultations can be arranged with the senior Dietitian, and a special 40-page book on specific dietary problems, "Diet and the General Practitioner," will be sent on request. All these services are free of charge to practitioners throughout the United Kingdom. For further details, write or telephone the Energen Dietary Service, 25a Bryanston Square, London, W.1 (AMBassador 9352).

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THE HOUSE OF HEWLETT

SEDATION

- with hypnosis

BARBURAL, administered orally, has an immediate hypnotic effect induced by cyclobarbitone calcium followed by prolonged sedation due to bromvaletone.

- with analgesia

SOMNIFERUM is indicated in all conditions in which pain is associated with insomnia. The synergistic action of sodium barbitone, codeine and phenacetin ensures minimal dosage with little risk of side effects.

C. J. Hewlett & Son, Ltd.,
King George's Avenue, Watford, Herts.
Telephone: Watford 7761

A new preparation

Quotane Ointment

Here is a new topical anaesthetic, chemically unrelated to the 'caine' group, with a remarkably low index of sensitization. When the patient's symptoms of itching, burning and pain are hindering progress, when they are causing sleeplessness, or when scratching is leading to secondary infection of the lesions, this highly effective antipruritic may often provide a valuable support to treatment.

In 1-oz. (28 g.) tubes

SMITH KLINE & FRENCH INTERNATIONAL CO.

represented by MENLEY & JAMES, LTD., Coldharbour Lane, London, S.E.5
Tel: BRIxton 7851 'Quotane' is a registered trade mark

QOP74®

All Iron Deficiencies

readily yield to treatment

with

FERRONICUM

Tablets of Ferrous Gluconate B.P.C. (0.3 gramme)

Ferrous Gluconate is the bivalent iron salt which is best utilised and tolerated by the body, rendering possible intensive and protracted ORAL treatment in the most fastidious patients.

Information and clinical samples available upon request

Bottles of:
50 tablets
100 tablets
1,000 tablets } **dispensing packs**

SANDOZ

SANDOZ PRODUCTS LIMITED

134, *Wigmore Street,* *London, W.*1

PAYNOCIL

OVERCOMES ASPIRIN IRRITATION

Paynocil is a new, non-irritant, palatable analgesic representing a considerable advance in formulation of products of its kind. It combines acetylsalicylic and amino-acetic acids in a tablet offering the following advantages:

- *It does not cause gastric irritation.*
- *It provides the most palatable and convenient form of analgesic medication.*
- *It disintegrates pleasantly and rapidly on the tongue; swallowing with water or chewing are unnecessary.*
- *An effective dose of aspirin (10 grains—0·65 gramme) is provided in one tablet.*

PACKAGING AND PRICES: *Tubes of 18 and dispensing packs of 240 tablets. Basic N.H.S. cost of 240 . . . 27/1.*

Long Term, Intensive Use
Because of its non-irritant properties Paynocil is ideal in the prolonged aspirin therapy necessary in rheumatoid arthritis.

Short Term or Occasional Use
It is equally suitable for the occasional analgesia required for headaches or neuralgia owing to its convenience and acceptability to all patients.

FORMULA: each tablet contains:

Acetylsalicylic acid	*10 grains (0·65 gramme)*
Amino-acetic acid	*4 grains (0·22 gramme)*

C. L. BENCARD LTD BENCARD **PARK ROYAL, LONDON, N.W.10**

TELEPHONE: ELGAR 6681. TELEGRAMS: BENCARLOND, HARLES, LONDON.

A new route for salicylate therapy

Algesal balm has only one active principle, the newly-synthesised compound, diethylamine salicylate, which differs from other salicylates in that it is *not* a counter-irritant nor a rubefacient.

Diethylamine salicylate has been shown to penetrate the skin in significant quantities and this discovery has opened up a new route for salicylate therapy.

The site of action of salicylates taken by mouth is still not known for certain and some authorities suggest that it may be peripheral, at the site of the pain[1]. Percutaneous salicylate therapy thus has immense possibilities, and Algesal is proving to be a most valuable remedy for the relief of local tissue pain by inunction.

The indications for Algesal fall naturally into four groups: rheumatism, closed inflammatory conditions, pain following trauma of different kinds, and certain painful conditions of unknown aetiology — e.g., chilblains and idiopathic night cramps.

Algesal is a non-staining white cream with a pleasant smell of lavender. It contains 10% diethylamine salicylate, in a vanishing cream base specially formulated to assist skin penetration.

Samples and literature will gladly be sent on request to the manufacturers, E. G. H. Laboratories Ltd., Peru Street, Adelphi, Salford 3.

[1] Practitioner, (1953) 170, 515

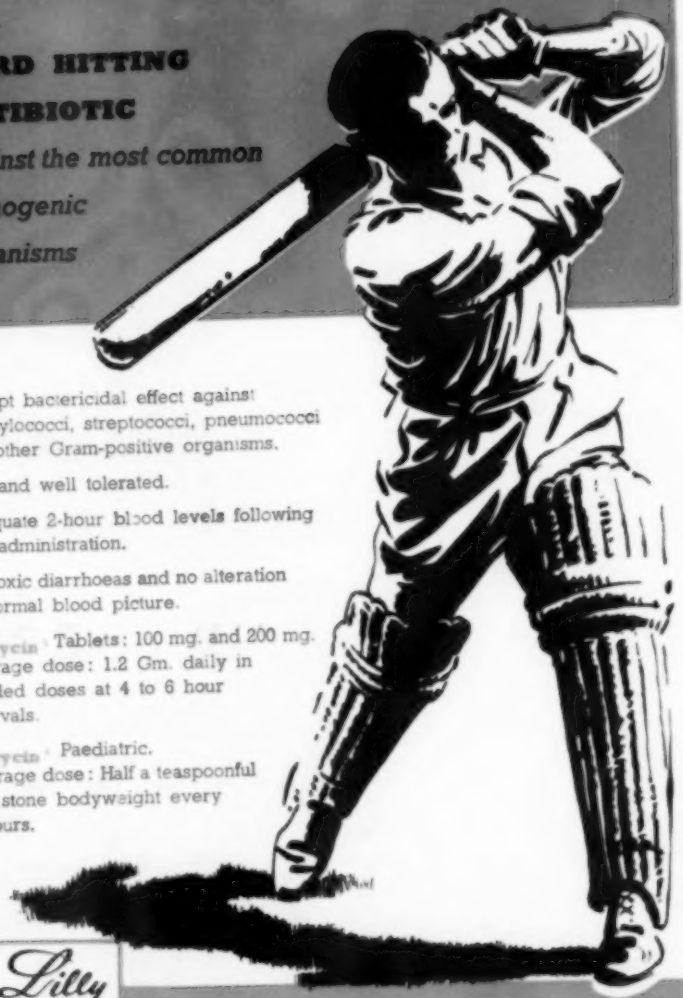
Algesal

E.G.H. LABORATORIES LTD., PERU ST., SALFORD 3, LANCS

ILOTYCIN
TRADE MARK

ERYTHROMYCIN

The
HARD HITTING
ANTIBIOTIC
against the most common
pathogenic
organisms



Prompt bactericidal effect against staphylococci, streptococci, pneumococci and other Gram-positive organisms.

Safe and well tolerated.

Adequate 2-hour blood levels following oral administration.

No toxic diarrhoeas and no alteration of normal blood picture.

'Ilotycin' Tablets: 100 mg. and 200 mg. Average dose: 1.2 Gm. daily in divided doses at 4 to 6 hour intervals.

'Ilotycin' Paediatric. Average dose: Half a teaspoonful per stone bodyweight every 6 hours.

Lilly
TRADE MARK

ELI LILLY & COMPANY LIMITED · BASINGSTOKE · ENGLAND

up . . . and . . .

Terramycin* BRAND OF OXYTETRACYCLINE
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The development of Dibenzylethylenediamine Dipenicillin* is one of the important milestones in antibiotic therapy[1]

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1. HENRY WELCH. Antibiotics and Chemotherapy, April 1953, p. 351.

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Also available without antihistamine as drops and spray

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DALMAS TRANSPARENT WOUND DRESSING

The Dalmas Transparent Wound Dressing consists of a clear, transparent observation panel spread with adhesive along the edges and incorporating two strips of antiseptic dressing.

Reports have been received on the use of DALMAS transparent wound dressings on over 500 major operation cases, during a period of 6 months. Not a single case of sepsis occurred.

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Each tablet contains : 'Dexedrine' 5 mg. Amylobarbitone 32 mg. (gr. ½). Acetylsalicylic Acid 160 mg. (gr. 2½). Phenacetin 150 mg. (gr. 2½)

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Sanatogen as an aid in treatment of

Stress Disorders

It is now widely recognised that a high percentage of all cases seen by the general practitioner today can be attributed wholly or partly to stress disorders. Though the symptoms may be diverse (rheumatism, headache, insomnia, dyspepsia, diarrhœa, effort syndrome, etc.), a common factor in the patients is their inability to withstand the pressure to which he or she is subjected.

A SUGGESTION FOR THE GENERAL PRACTITIONER

In the treatment of these stress disorders the general practitioner will find that Sanatogen protein nerve tonic is an extremely useful adjunct, particularly when dealing with patients who insist on a tonic, when strong suggestion is needed, or for people who are reluctant to accept stress as a diagnosis.

THE ROLE OF SANATOGEN

Sanatogen is 95% casein chemically combined with 5% sodium glycerophosphate, and has a vigorous tonic effect on the physical and nervous system. Three teaspoonfuls of Sanatogen t.d.s. (the normal dosage) provide the patient with 24 grams of protein daily, free from fat and cholesterol; whilst by reason of its glycerophosphate content it has a specific tonic effect on body and nerve tissue. Although Sanatogen is not prescribable owing to its high food value, it has been widely recommended by the profession for more than 50 years.

Sanatogen

THE PROTEIN NERVE TONIC

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Aluphos Trade Mark

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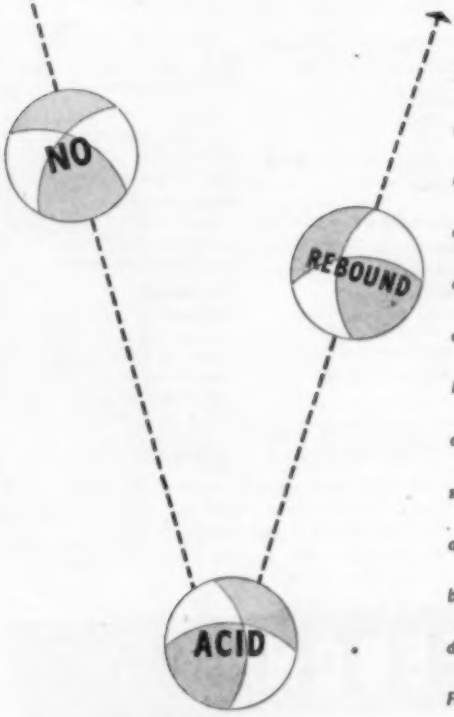

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1. LANCET, 1954, 2, 942. 3. B.M.J., 1954, 2, 1255.
2. B.M.J., 1954, 2, 1257. 4. LANCET, 1954, 2, 1245.

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(LANCET, 1954, 2, 1245).

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3 Penetrates sub-mucous tissues. Vaso-constrictive, decongestive, antiseptic.

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Pharmalogical Studies with Rescinnamine, a New Alkaloid Isolated from Rauwolfia serpentina, Proc. Soc. Exper. Biol. and Med.*, 1954, **86, 120

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for successful peptic ulcer therapy

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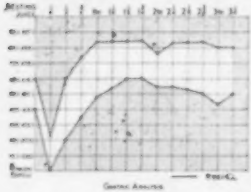
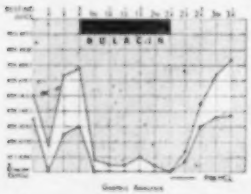
NOW NULACIN provides all the advantages of milk-alkali drip therapy without the discomfort of a tube and without inconvenience to the patient.



Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer



Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.

NULACIN

is available throughout the British Commonwealth, in the U.S.A. and many other countries. It is known as Nulactin in Canada and Sweden.

INDICATIONS

NULACIN tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

Beginning half-an-hour after food, a NULACIN tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.

NULACIN tablets are not advertised to the public and have no B.P. equivalent. May be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-.) Also available in tubes of 12.

NULACIN tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol. Menth. Pip. q.s.

BIBLIOGRAPHY:

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Medical Treatment of Peptic Ulcer. *Med. Press*, 27th February 1952, 195-199
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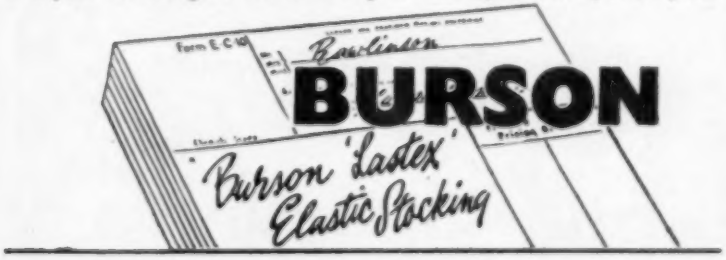

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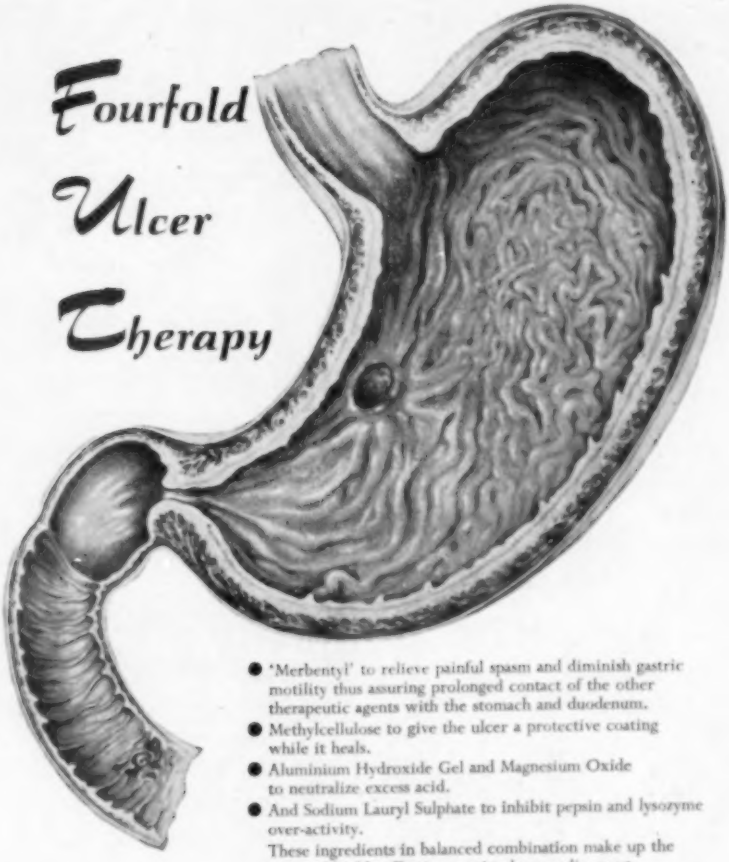

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- Methylcellulose to give the ulcer a protective coating while it heals.
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After many bacteriological experiments this mask was designed to arrest all droplets from the mouth and nose, and so to prevent contamination during operation. The "Cestra" Mask consists of four layers of fine dental gauze. It fastens securely under the chin, has an air gap at the sides, is comfortable to wear for long periods and may be easily sterilised.

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Packed in 2-oz., 4-oz., 8-oz. and 16-oz. bottles and for injection in ½-oz. rubber-capped bottles, sterile, ready for use.

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FERRIS & CO LTD

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New comprehensive treatment for specific and non-specific diarrhoea

'CREMOMYCIN'

'SULFASUXIDINE'-NEOMYCIN SUSPENSION *Trade Mark*

SHARP & DOHME

. . . combined antibacterial activities of
'Sulfasuxidine' and neomycin

RAPID RELIEF

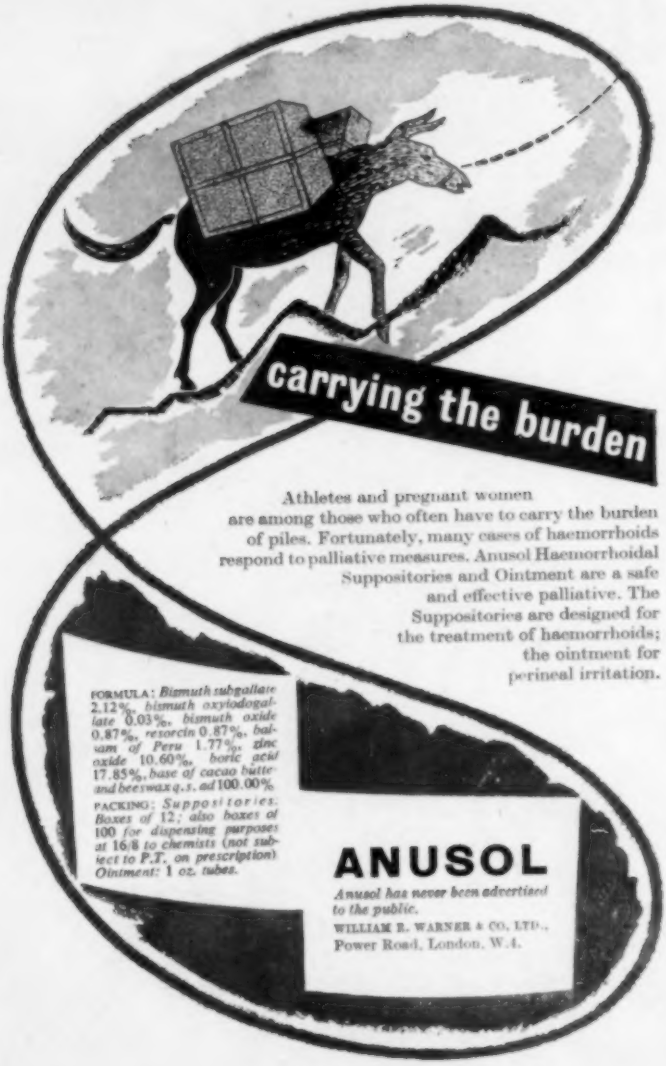
The action of 'Cremomycin' is prompt, complete and effective. Within a few hours, the combined bactericidal and bacteriostatic activity of 'Cremomycin' is concentrated in the intestinal tract. This concentration means effective action — and prompt relief for the patient.

PROMPT REMISSION

There are many obvious advantages (besides relief for the patient) in prompt recovery from diarrhoea: prevention of severe losses of body fluids; reduction of local irritation; protection against complications; avoidance of the spread of infective organisms.
Moreover, secondary constipation is not encountered after therapy with 'Cremomycin'.

Each 30 ml. (approximately 1 fl. oz.) contains: 'Sulfasuxidine' Succinylsulphathiazole 3 G., Colloidal Kaolin 3 G., and Neomycin Sulphate 300 mg.
'Cremomycin' Suspension is supplied in bottles of 8 fluid ounces.
Descriptive literature will gladly be sent on request.

SHARP & DOHME LTD., HODDESDON, HERTS.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Athletes and pregnant women are among those who often have to carry the burden of piles. Fortunately, many cases of haemorrhoids respond to palliative measures. Anusol Haemorrhoidal Suppositories and Ointment are a safe and effective palliative. The Suppositories are designed for the treatment of haemorrhoids; the ointment for perineal irritation.
FORMULA: Bismuth subgallate 2.12%, bismuth oxyiodogallate 0.03%, bismuth oxide 0.87%, resorcin 0.87%, balsam of Peru 1.77%, zinc oxide 10.60%, boric acid 17.85%, base of cacao butter and beeswax q.s. ad 100.00%.
PACKING: Suppositories. Boxes of 12; also boxes of 100 for dispensing purposes at 16/8 to chemists (not subject to P.T. on prescription). Ointment: 1 oz. tubes.
ANUSOL
Anusol has never been advertised to the public.
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Immediate neutralization of gastric acid, yet unaccompanied by the disadvantages arising from carbonate medication, clearly indicates the clinical superiority of 'Milk of Magnesia'* as a therapeutic antacid.

Non-systemic in action, 'Milk of Magnesia' may confidently be prescribed in a wide variety of conditions associated with gastric acid disturbance—from the mild case of dyspepsia to the acute ulcer stage—where intensive alkaline treatment is essential.

'Milk of Magnesia' reacts with the acids of the stomach to form a neutral laxative salt which promotes gentle but effective elimination.

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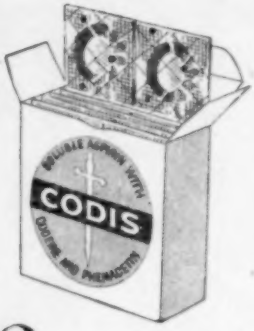
* *'Milk of Magnesia' is the trade mark of Phillips' preparation of magnesia.*



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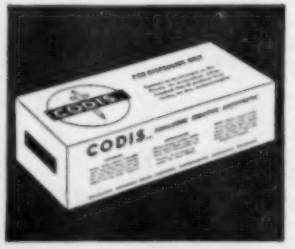
THE ADVANTAGE OF "CODIS" to the physician is this.

Like Tab. Codein. Co. B.P., Codis offers the valuable and tried combination of aspirin, phenacetin and codeine phosphate. But the aspirin in Codis, unlike that in Tab. Codein. Co. B.P., is in the form of soluble calcium aspirin—which is formed immediately the tablet is dissolved in water. This calcium aspirin is of course far less likely to cause the gastric irritation sometimes produced by acid particles of ordinary aspirin.

Because it is readily soluble, Codis will be found easier to administer—and the aspirin it contains will be rapidly absorbed by the patient.



COMPOSITION

Each Codis tablet contains:—Acid. Acetylsalicyl. B.P. 4 gr.; Phenacet. B.P. 4 gr.; Codein. Phosph. B.P. 0·125 gr.; Calc. Carb. B.P 1·2 gr.; Acid. Cit. B.P. (Exsic.) 0·4 gr.

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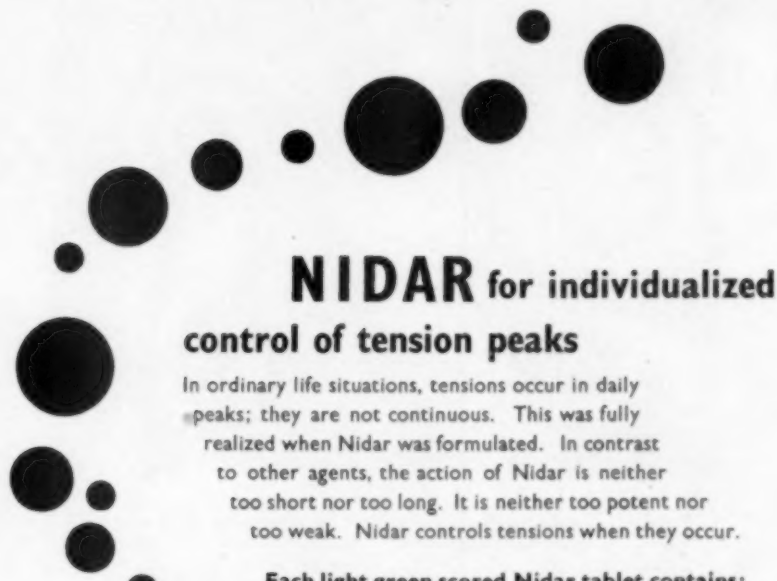
FOR PRESCRIPTION. Codis is available in distinctive gold foils of 6 tablets each.

PUBLIC SIZE. 20 tablets in foil, 2/7 each, inc. P.T.

RECKITT & COLMAN LTD., HULL & LONDON (PHARMACEUTICAL DEPT., HULL)

release . . .
without overdrugging



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Each light green scored Nidar tablet contains:

Secobarbital Sodium	**¼ gr.**
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At whatever stage you see Eczema-Dermatitis you can prescribe Safe effective treatment

PRESCRIBABLE ON E.C.10

at the sub-acute stage when the lesion is drying up, a little weeping may still be present but the area is mainly crusted, irritant and sore, apply

Zicthol

CREAM

a cream containing 16% zinc oxide, 4% ichthammol and 2% camphor in a soothing, drying base.

Where infection is present a modified form of Zicthol known as ZICTHOL GREEN is advised. This is similar to Zicthol but contains also 1% malachite green and 1% undecylenic acid.

Basic N.H.S. cost
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3/- for 2 oz. tube.

at the chronic stage when the area is red, dry and scaly, usually with intense irritation, it is safer and more effective to use, instead of the customary coal tar preparation,

Pixcyl

CREAM

containing purified fraction equivalent to 5% crude coal tar, 1% salicylic acid, 25% zinc oxide in a non-drying base.

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Medical Dept.,
GENATOSAN LTD. *Loughborough, Leicestershire*

S.P.1040/51

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The distress caused by the piercing, stabbing pains of neuralgia is quickly relieved by the rapid, smooth, analgesic action of HYPON TABLETS, enabling the practitioner to prescribe a safe means of meeting the patient's need. Menstrual pain is also effectively alleviated. Where the cause of distress is more chronic, as in rheumatism and sciatica, the adverse effects of prolonged medication with codeine and salicylic therapy are eliminated by the inclusion of caffeine and phenolphthalein. HYPON TABLETS are already widely prescribed for their speedy and safe action with the almost complete elimination of gastric upset. Febrile states are effectively reduced in conditions such as influenza, coryza and tonsillitis.

FORMULA : *Acid Acetylsalicyl B.P.* 40.22%. *Phenacet. B.P.* 48.00%. *Caffein. B.P.* 2.00%. *Codein. Phosph. B.P.* 0.99%. *Phenolphthal. B.P.* 1.04%. *Excip.* 7.75% (*each tablet* 8 *grains*)

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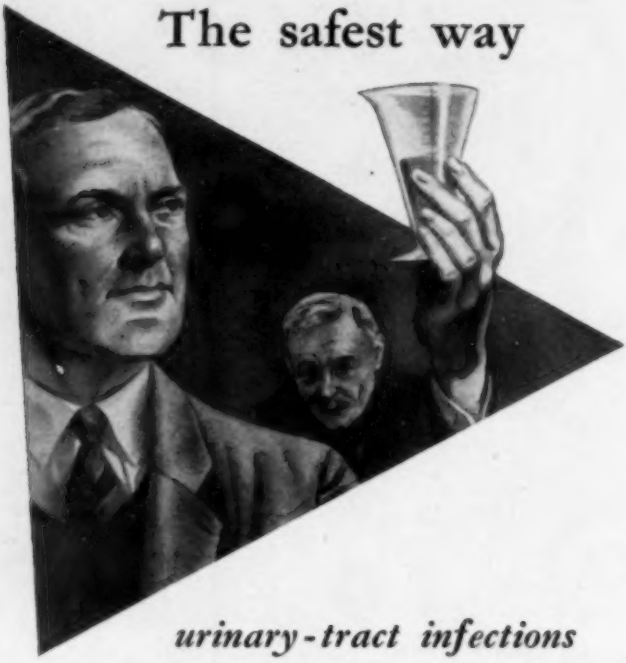

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MANDELAMINE tablets

a urinary antiseptic of high potency that speedily brings infections under control. Side-effects are unusually rare and mild, rendering it especially valuable in chronic disorders.

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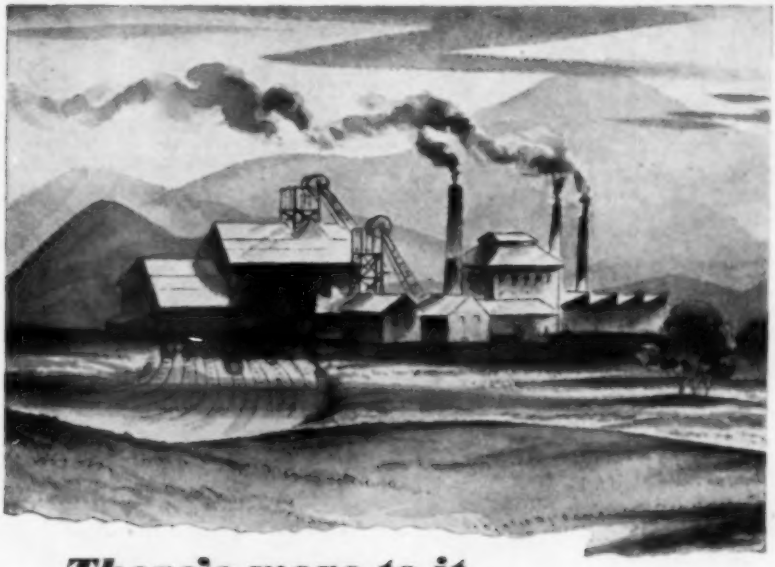
'Mandelamine' is the trade mark of Nepera Chemical Co., Inc.

MP55



There's more to it than meets the eye

How often this is true, and how true it is! For instance, when one looks at a pithead, it gives little indication of all that it stands for and over.

Far below, a teeming world of brain and brawn relentlessly pursues its task of providing us with the fuel so vital to our existence. Similarly, a Cow & Gate tin conveys little of the vast amount of scientific research and painstaking testing always going on behind the scenes. But it is because of this that its contents are as effective in infant feeding practice as human ingenuity can make them.

COW & GATE MILK FOODS

S229 GUILDFORD SURREY

For Hay Fever ...

... the ideal nasal decongestant

Fenox

NASAL DROPS

Boots

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ULCER
EMOTIONS

EMOTIONAL DISTURBANCE...

A close association has been shown to exist between certain emotional disturbances and changes in gastric function. Increased acid secretion has been observed to follow emotional reactions of a combative nature and the importance of controlling gastric acidity in the management of peptic ulcer is widely recognised.

'Aludrox' Amphoteric Gel, buffers gastric acid to a pH of 3.5 to 4.0, at the same time providing a protective gel barrier over the surface of the ulcer. Healing is thus able to proceed whilst the risk of alkalosis is avoided and normal digestion is unimpaired.

'ALUDROX'
Trade Mark

Wyeth

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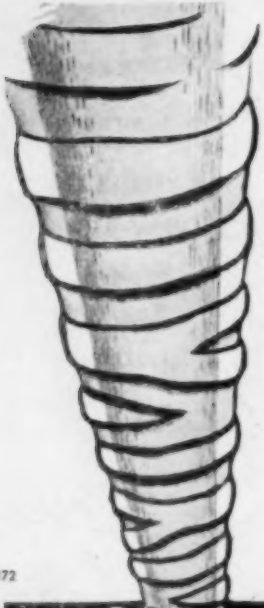

Relieving the bronchial tree in asthma

'ASMAC' TABLETS are formularized to provide symptomatic relief of the bronchial tree both during actual dyspnoeic attacks of bronchial asthma, and during remissions.

'Asmac' Tablets combine in a single prescription 'official' drugs recognized for their reliability to effect mental sedation, decongestion, expectoration and bronchodilation.

PACKS AND COST TO PHARMACISTS

Standard Tube of 20: 3/-.
Dispensing Bottles: 100, 12/-; 500, 52/6; 1,000, 102/6.

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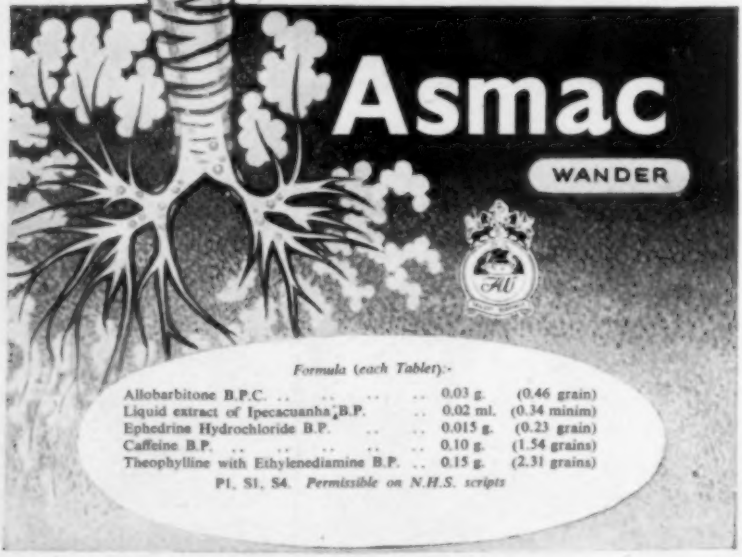

Formula (each Tablet):-

Allobarbitone B.P.C.	0.03 g.	(0.46 grain)
Liquid extract of Ipecacuanha B.P.	0.02 ml.	(0.34 minim)
Ephedrine Hydrochloride B.P.	0.015 g.	(0.23 grain)
Caffeine B.P.	0.10 g.	(1.54 grains)
Theophylline with Ethylenediamine B.P.	0.15 g.	(2.31 grains)

P1, S1, S4. *Permissible on N.H.S. scripts*

Fourfold Control

in Peptic Ulcer and Hyperchlorhydria

Packs and Prices to Pharmacists:

Bottle of 50,
2/11 *plus* 9*d.* P.T.;
Bottle of 250,
12/6 *plus* 3/1½ P.T.;
Bottle of 500,
23/9 *plus* 5/11½ P.T.

ALOCOL COMPOUND is a new preparation formularized to provide comprehensive management of causal and symptomatic disturbances in the treatment of hyperchlorhydria and its manifestations, including gastric and duodenal ulcer.

Formula each Tablet		*ALOCOL COMPOUND tablet: effect*	
'Alocol' (Coll. Alumin. Hydroxide)	11.58 gr.	——— ←	antacid protection
Ext. Belladon. Sicc. B.P.	0.071 gr.	——— ←	diminished secretion
Papaverine Hydrochlor. B.P.	0.51 gr.	——— ←	reduced motility
Benzocaine B.P.	0.51 gr.	——— ←	sensory anaesthesia

Alocol Compound thus provides the advantage of fourfold control—reduction of causal hyperacidic flow, and its neutralization; alleviation of symptomatic hypermotility and pain.

ALOCOL *Compound*

Professional sample on request from Medical Dept.

A. WANDER LIMITED, 42 Upper Grosvenor Street, London W.1

M390

Antihistamines for old and young

When the contents of Pandora's Box were released, Hope alone remained. To the patient of allergic diathesis, threatened by a veritable Pandora's Box of ills, the antihistamines 'Histantin' and 'Actidil' represent far more than hope.

For adults 'Histantin' is the product of choice, giving prolonged relief with a minimum of side-effects.

The new quick-acting antihistamine, 'Actidil', exerts its effect for about 12 hours and is also notable for low incidence of side-effects. 'Actidil' Elixir has been specially formulated and clinically tried for the treatment of allergic conditions in children.

'HISTANTIN', *50 mgm., is issued in bottles of 25, 100 and 500 at list prices (subject to usual discount) of 6/6, 24/6, 110/-.*

'ACTIDIL' *compressed products of 2·5 mgm. in bottles of 25 and 500 at list prices (subject) of 6/6 and 110/-.*

'ACTIDIL' ELIXIR *in bottles of 20 fluid ounces, for dispensing, at a list price (subject) of 15/-.*

BURROUGHS WELLCOME & CO. (The Wellcome Foundation Ltd.) **LONDON**

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Safer Hypotensive Surgery

Hypotensive techniques are rapidly gaining popularity in certain types of surgery because they

Procure a comparatively dry operating field
Reduce blood loss
Save blood transfusions
Reduce shock

'ARFONAD'
trade mark brand

'Arfonad', a hypotensive drug discovered in the Roche Laboratories, has a rapid and transient action which makes it ideal for use by continuous intravenous drip to reduce blood pressure during operations. Clinical trials have amply demonstrated its effectiveness and safety and 'Arfonad' is rapidly becoming the drug of choice for hypotensive surgical techniques.

'Arfonad' is now available in vials of 250 mg. together with 5 c.c. ampoules of pyrogen-free distilled water.

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One of a complete range of

Iron Preparations

Many oral iron preparations cause gastro-intestinal irritation thereby making it impossible to administer sufficient iron by the oral route to restore the hæmoglobin level to normal. Colloidal ferric hydroxide in the form of COLLIRON overcomes this great disadvantage, as the iron is presented in a non-irritant form and is readily tolerated even in large dosage over a prolonged period.

Presentation

Bottles of 4 fl. oz. and 8 fl. oz.
Dropper bottles of 30 ml.
COLLIRON is also available in capsules.
If rapid response to iron therapy is needed COLLIRON I.V. is unexcelled.

OUTSTANDING ADVANTAGES OF COLLIRON

1. *Pleasant to take*
2. *Well tolerated*
3. *Efficient utilization*
4. *Does not stain the teeth*
5. *Particularly suitable for children to whom it can easily be administered by means of a special dropper bottle.*

COLLIRON

Further information on request from : **EVANS MEDICAL SUPPLIES LIMITED,**
Speke, Liverpool 19, and Ruislip, Middlesex.

846

THE PRACTITIONER

No. 1044 JUNE 1955 Volume 174

THE MONTH

THE increase in food poisoning—e.g. from 3,347 incidents in 1951 to 5,277 in 1953—is one of the disturbing features of the public health. Processed, made-up and reheated dishes are the principal causes and, as the Chief Medical Officer to the Ministry of Health has pointed out, 'the remedy is largely in the hands of caterers'. The general practitioner, however, has also an important part to play both in the early detection of an outbreak and, of even more importance, in prevention. It is for this reason that we have devoted a symposium to this important problem. The dual role of the general practitioner in helping to overcome this public health hazard is discussed by Dr. Hugh Paul in his article on 'How to deal with an outbreak of food poisoning' and by Professor Fraser Brockington in his article on 'The prevention of food poisoning in the home'. As the latter points out, 'the general practitioner can do much by teaching, vigilance in detecting causes of infection and explaining their risk, and by cooperation with the health department to provide a first line of defence'. The scope of the problem is ably reviewed in the introductory article by Dr. Kenneth Cowan, Chief Medical Officer to the Department of Health for Scotland, whilst the clinical and bacteriological aspects are discussed by Dr. E. C. Warner and Professor J. C. Cruickshank. Dysentery and enteric fever, two aspects of the subject of particular interest to the clinician, are reviewed by Dr. A. B. Christie and Dr. Stanley Banks. The solution of the problem is simple and attainable, and Dr. Marjory Oldershaw epitomizes it admirably in her article on 'The prevention of food poisoning in restaurants and canteens': 'clean food handled by clean people in clean premises with clean equipment, and protection of food from contamination by flies and vermin'.

The Symposium

AN important aspect of the subject which is not specifically dealt with in the symposium is the state of hygiene of food shops in this country. There has undoubtedly been a marked improvement of recent years, particularly in the larger shops, but there is still much room for improvement. In too many shops is food left exposed to the air all day, and not infrequently a cat can be seen basking in the sunshine in the window while the bluebottles buzz contentedly around the juicy Sunday joints. The overalls and aprons of the assistants seldom give cause for complaint, but too often does one see an assistant licking her finger in order to pick up the sheet of paper in which to wrap the cheese or

Soiled Shops

butter. The assistant with a heavy cold who repeatedly sneezes over the food, or is continually handling a soiled handkerchief, is even more of a menace. Two other crimes against the public health are still encountered. One of these is the sweeping of the floor without measures such as sanding or moistening to lay the dust. The other is the admission of dogs to food shops. To lay upon the shopkeeper the onus of discriminating between the house-trained dog and the dog which is not so trained is obviously not reasonable, but is there any reason why there should not be a bye-law in all areas forbidding the taking of dogs into such shops?

These are but some of the more obvious unhygienic measures which are encountered every day in food shops throughout the country and cause such concern, and amazement, to visitors from overseas. In even such a health-conscious nation as the United States, as many a visitor has noted, the human element cannot always be controlled, but there is no reason why it should not be made compulsory for all food for human consumption to be adequately covered while on display. So far as the staff is concerned, the solution of the problem is in the hands of the proprietors, and they would be well advised to adopt in their shops the rules of personal hygiene outlined by Dr. Oldershaw (p. 690). The ultimate sanction lies in the hands of the housewives of the country. Those public health authorities which have not already done so should set up Clean Food Societies with emblems which are displayed by shops which submit to voluntary inspection and conform with rules prescribed by the local authority. If these measures were backed up by a national publicity campaign, it would not be long before recalcitrant shopkeepers fell into line with that increasing number of progressive food purveyors who attain to a commendably high standard of cleanliness in their premises.

Too Many Outpatients?

In 1953, the last year for which official figures are available, 6.7 million outpatients attended hospital and the outpatient attendances at consultative clinics, excluding radiotherapy departments, totalled 27.2 million. How many of these attendances were really necessary? Much is heard these days about delays in outpatient departments, about ingenious appointment schemes and even about new outpatient departments. Little attention, however, appears to be given to the fundamental consideration of the precise scope and functions of a hospital outpatient department or clinic. Where is the line to be drawn between the duties of the general practitioner and those of the hospital consultant? Upon the answer to this question depends the professional status of the general practitioners of the country. Of recent years there has undoubtedly been a tendency for the specialists to assume that they, and they alone, are capable of treating the patients referred to them in hospital. The result has been that hospital outpatient departments have become more and more congested, whilst the man in practice has been steadily deprived of

those interesting cases in his practice upon which he could exercise his clinical zeal and acumen.

Surely, the function of a hospital outpatient department is to provide the patient's family doctor with an accurate diagnosis and recommendations for treatment. To go further than this, except in special cases in which treatment is too complicated for domiciliary practice, is to put an unnecessary load upon the hospitals and to deprive general practitioners of that final responsibility for the care of their patients, which is the basis of all sound clinical practice. It might be argued that follow-up clinics come into a special category. This suggestion, however, can only be accepted provided that either the treatment or the supervision is such as can only be carried out by a specialist, or alternatively that the clinic is part of a special investigation. No-one would decry the value of the follow-up clinic but its functions must be stringently defined, and it must be carefully integrated into the general scheme of medical service. Divided responsibility is good for neither the future of medicine nor the patient. The fundamental rule, which is tending to be overlooked, is that the primary responsibility for the patient rests upon his general practitioner. If the consultant wishes to participate in the care of the patient then he must ensure that the general practitioner is kept regularly and fully informed of the opinion of the consultant and of his recommendations for treatment. If the family doctor is capable of carrying out the recommendations of the consultant to whom he refers his patient in private practice, then he is equally capable of carrying out the instructions of the consultant who sees his National Health Service patients in a hospital outpatient department or clinic.

Myxomatosis

On more than one occasion we have received requests from readers in rural areas, seeking information about myxomatosis. In view of the widespread interest, particularly in the humanitarian and medical aspects of the epizootic which is now sweeping the country, we invited Dr. E. J. Moynahan to contribute a short, but comprehensive article summarizing the salient features of the condition. Dr. Moynahan is particularly well qualified to review the subject as he was called to examine the first alleged human case of myxomatosis in this country. His account is as reassuring as it is fascinating.

It is practically fifty years since the disease was first described by Sanarelli, in whose laboratory in Montevideo it swept through the animal houses killing off practically every rabbit in the laboratory. As long ago as 1927, Aragão suggested that it might be effective in exterminating the rabbit in Australia, but it was not until his later work demonstrating conclusively that it was an insect-borne disease that his suggestion could be carried into practice. Subsequent experience in Australia, Europe and in this country has amply demonstrated the efficacy of this virus disease as a cure for the rabbit problem. That there is no risk to other animals, except certain hares,

has been confirmed over and over again. In 1898, Sanarelli failed to infect mice, guinea-pigs, monkeys, fowls or human beings with the disease, and these findings have been confirmed both in this country and in Australia. In Dr. Moynahan's words: 'It cannot be emphasized too strongly that there has been no case of the disease in any animal other than members of the Lagomorph order: native South American rabbit, cotton-tails, the European rabbit and a very few hares. Man cannot be infected . . . There is no evidence that dogs or cats are susceptible to the disease any more than humans, and it should be remembered that carrion feeders and predators such as foxes (close relatives of the dog) thrive on the diseased rabbits'. He is equally reassuring on the humanitarian aspects. The deceased animal is a revolting sight but, 'in view of the widespread cerebral lesions, it is probable that the sick animal is not very much aware of its plight . . . Stories of suicide and of animals screaming with pain can certainly be disregarded as pure invention; the screams are more likely to come from a trapped animal than a sick one'.

Fifty Years' Service

HAVING seen the advertisement pages of this issue through the press, Mr. Charles T. Lawrence, our Advertisement Manager, left us to enjoy a well-earned retirement after fifty years' service with *The Practitioner*. 'Doc. Lawrence', as he is affectionately known in Fleet Street, where he is a well-known member of the Press Club, and in the advertising world, has an unsurpassed knowledge of his subject. He came to *The Practitioner* in the days when top hats were *de rigueur*, and empiricism was the keynote of pharmacy. Elegant preparations were the pride of every pharmaceutical house and antibiotics were still considered to be the figment of the imagination of armchair bacteriologists. The pages for which he has been responsible throughout the years are representative of the revolution which pharmacology and therapeutics have undergone during the most exciting half-century in the history of medicine. Throughout it all Lawrence has kept abreast of the changes. Pharmaceutical companies might come and go, but he always knew what was happening: ever on the look-out for what was new but always retaining the respect and affection of those with whom he dealt. For many a long year it has been impossible to imagine the London Medical Exhibition without Lawrence's cheery figure, greeting visitors at our own stand or paying his round of visits to other stands, meeting old friends and making new ones. Although retiring from active duty, his services will still be available in an advisory capacity.

We who have had the pleasure of working with him will miss him—his unfailing good humour, his frankness and his shrewd comments. Above all, however, we shall always recall his loyal service. *The Practitioner* has had no more devoted servant, and he takes with him the grateful thanks of the editors and directors for all he has done for the journal, and their best wishes for a long and happy retirement.

FOOD POISONING: THE SCOPE OF THE PROBLEM

By H. KENNETH COWAN, M.D., D.P.H.
Chief Medical Officer, Department of Health for Scotland

THE term food poisoning is applied to a group of gastro-intestinal diseases closely allied in their symptoms but varying in their causation. They may be of chemical or bacterial origin, but bacillary dysentery and other infections of the alimentary tract statutorily notifiable under Public Health Acts are not included in the group. Moreover, outbreaks of gastro-intestinal illness characterized by nausea, vomiting and diarrhœa, which after patient and careful investigation yield no pathogenic organisms or vehicle of infection, have been described in this country by Bradley (1943) and in the United States of America by Dack (1941), Jaffe (1948) and others, under the heading of winter vomiting disease, epidemic gastroenteritis and viral dysentery. In the recording of cases or outbreaks of food poisoning these conditions should be excluded but the practitioner faced with a patient exhibiting symptoms of acute gastroenteritis cannot be expected to make immediate finer differentiations as to causation, and much investigation may be necessary before a diagnosis of food poisoning can be made. Section 17(1) of the Food and Drugs Act, 1938, requires a registered medical practitioner to notify cases of food poisoning or suspected food poisoning to the medical officer of health and prompt notification enables all the machinery of the public health department to be brought to bear on control and on action to try to establish firm evidence as to the cause.

Since 1938, information as to sporadic cases and outbreaks has been available to medical officers of health, and more precise details of the incidence of food poisoning have been gathered from investigations undertaken by them. It was the practice of medical officers of health to report outbreaks of food poisoning to the Ministry of Health, but in 1949 the Ministry asked for more precise data in a form which would enable collation of related facts to be made and the importance of various factors to be assessed on a national basis. It has been possible over the past five years to assess with considerably greater accuracy the prevalence of food poisoning and to evaluate all aspects of the problem more precisely. The recording of information conforms to a standard pattern with the following definition of terms:

An *outbreak* means two or more related cases in persons in different families.

A *family outbreak* means two or more related cases confined to members of the same family.

A *sporadic case* means a case which was not, so far as could be ascertained, related to other cases or excretors.

Each outbreak, family outbreak and sporadic case has been considered as one unit and is referred to as an *incident*.

INCIDENCE

Reasonably accurate comparison can now be made as to the incidence of food poisoning from year to year. The recorded incidence is probably less than the true incidence, particularly in the categories of sporadic case and family outbreak, since it is unlikely that mild attacks in many instances are considered to justify the attention of the family doctor.

The total number of recorded incidents since the inception of the arrangements for recording in 1949 is set out in Table 1.

Year	Outbreaks	Family outbreaks	Sporadic cases	All incidents
1950	539	453	2,987	3,979
1951	343	287	2,717	3,347
1952	372	340	2,807	3,519
1953	492	422	4,363	5,277
Totals	1,746	1,502	12,874	16,122

TABLE 1.—Incidence of food poisoning in England and Wales, 1950-53.

It is manifest from these figures that there is an increased prevalence of food poisoning and that steps to control its incidence have been disappointing in their results. The methods of recording and classification have been in use for a sufficiently long period to justify the assumption that the increases in incidents in 1952, and particularly in 1953, are due to greater prevalence and not merely to better methods of reporting. The main increase has been in the number of sporadic cases and it is of interest, as mentioned later, that in 1953, *Salmonella typhi-murium* was responsible for 45 per cent. of these cases and for 62 per cent. of family outbreaks.

In Scotland, where food poisoning is not notifiable but where medical officers of health report outbreaks to the Department of Health, the total number of such outbreaks recorded was seven in 1952 and sixteen in 1953. In addition, six outbreaks were recorded in response to an inquiry sent to senior administrative medical officers of regional hospital boards, as having occurred in hospitals. As might be anticipated, of the incidents reported in 1952 and in 1953 none was a sporadic case and only three were family outbreaks. It is impossible therefore to make a comparison of the prevalence of food poisoning in Scotland and England and Wales but, taking into consideration climatic and other factors, the number of reported incidents gives no indication of the real prevalence in Scotland.

The Food and Drugs (Scotland) Bill now before Parliament contains a section making food poisoning notifiable to the medical officer of health. If this is enacted it will be possible to assess the amount of food poisoning in Scotland on a reasonably accurate basis.

CAUSAL AGENTS

The causative agents may be divided into chemical and infective, but

chemical poisons are rarely implicated and the overwhelming majority of cases are infective in origin. Of the total number of incidents reported in Table 1 only five were due to a chemical agent.

Presumed causal agent	Outbreaks	Family outbreaks	Sporadic cases	All incidents
Salmonellæ	620	1,012	7,269	8,901
Staphylococci	187	105	69	361
Cl. welchii	80	7	2	89
Other organisms	39	23	9	71
Chemical	2	3	—	5
Not discovered	818	352	5,525	6,695

TABLE 2.—Distribution of food poisoning in England and Wales, in relation to causal agents.

The distribution of classified incidents in relation to causal agents for the years 1950 to 1953 inclusive is shown in Table 2. Salmonella infection was by far the commonest etiological factor in the cases in which a causal agent was discovered, accounting for more than 94 per cent. of these cases; 3.8 per cent. were due to staphylococci and less than 1 per cent. each to *Cl. welchii* and to other organisms. There are, however, significant differences in the types of incident following infection by different organisms and also in the origin of symptoms. Salmonellæ were responsible for 7,269 sporadic cases, and of the total of 8,901 incidents only 620 involved more than one family. The role of the salmonella group therefore in the causation of true outbreaks of food poisoning is not so important relatively as would appear at first sight. Nevertheless, this group was responsible for more than twice as many outbreaks as all other types of organism put together in those cases in which an identifiable causal agent was discovered. Of the types of salmonella isolated by the public health laboratory service in 1953 (*Monthly Bull. Min. Health*, 1955), *Salm. typhi-murium* was responsible for 45 per cent. of the total sporadic cases reported, 33 per cent. of the outbreaks and 62 per cent. of the family outbreaks. Other salmonellæ were isolated from 14 per cent. of sporadic cases, 10 per cent. of outbreaks and 14 per cent. of family outbreaks. These organisms multiply rapidly in foodstuffs and possess powerful endotoxins capable of resisting 100° C. They multiply also in the intestinal tract and after an incubation period of twelve to twenty-four hours produce gastro-intestinal symptoms, abdominal pain, vomiting and diarrhœa, which in cases of severe infection may be accompanied by constitutional disturbances with rise of temperature, headache and nausea.

In the case of staphylococcal poisoning the enterotoxin is preformed in the food with a consequently much shorter incubation period (two to six hours) before the onset of symptoms—pre-eminently nausea and vomiting. Outbreaks ascribed to infection by *Cl. welchii* are characterized by abdominal pain and diarrhœa after an incubation period of up to eighteen

hours. The symptoms are usually mild and due to heat-resistant strains of the organisms which have multiplied in the food, particularly in meat dishes inadequately reheated. Among other organisms implicated in outbreaks were aerobic and anaerobic spore-bearers, coliform bacilli, fæcal streptococci and other presumed 'non-pathogens'.

VEHICLE OF INFECTION

During the years 1951-53, of the outbreaks of food poisoning reported to the Ministry of Health the proven or probable vehicles of infection were recorded in 817 instances. Meat was implicated in 536 outbreaks and in 422 of these it was processed or made up. Trifles, ice-cream, custard, cream buns and other types of sweetmeats were responsible in 73 incidents, eggs in 61, of which 47 implicated duck eggs, and fish in 64. Since the food involved was known in only about one-third of the outbreaks these figures may not accurately represent the vehicles of infection but the figures for meat dishes show a sufficient preponderance to justify these as the most common source of food poisoning. An appreciation of the importance of a particular foodstuff as the likely vehicle of infection has a bearing on the rapidity with which the investigation of an outbreak can be brought to a successful conclusion, particularly if the association of the presumed causal agent with the vehicle can be established. In the 422 outbreaks involving processed and made-up meat, of 265 where a causal agent was discovered, 114 were of staphylococcal origin, 42 *Salm. typhi-murium*, 47 other salmonellæ, 49 *Cl. welchii*, 13 other organisms. In outbreaks involving duck eggs the causative organism in all cases except one was *Salm. typhi-murium*. Where sweetmeats provided the vehicle of infection the largest number of infections was due to salmonellæ, but staphylococci, *Cl. welchii* and other organisms were frequently involved.

DEATHS

In the three years, 1951-53, the total number of deaths reported to the laboratory service was 120; of these, 111 were due to salmonella infection, three to *Staph. aureus*, two probably due to *Cl. welchii*, and in the remaining cases no causal organisms were identified.

PLACES

During 1951-53 the places where infection occurred were noted in 409 cases in which the outbreaks were not confined to single families (Table 3).

	Places where infection occurred					
Year	Canteens	Restaurants, hotels, etc.	Institutions	Shops	Other	Total
1951	63	11	12	12	10	108
1952	66	28	19	16	6	135
1953	58	42	21	30	15	166
Totals	187	81	52	58	31	409

TABLE 3.—Place of infection of 409 cases of food poisoning in England and Wales (1951-53).

In the 409 outbreaks in which the place of infection was recorded, canteens of various kinds were most often implicated. These included school and works canteens, and of the total of 187 outbreaks, 117 occurred in school canteens and 50 in works canteens. In comparing the ratios in these places to those in restaurants, hotels, and cafés it must be borne in mind that the tracing of a source of infection is easier in a school or works canteen where the victims are aggregated together than in a restaurant or café where customers may be widely dispersed. Nevertheless, the high proportion of outbreaks in schools is disconcerting.

PREVENTION

Although there is a wide reservoir of salmonella infection in animals, rodents and poultry, as well as in man, the problem of prevention of outbreaks of food poisoning can be related broadly to the promotion of a high standard of personal hygiene among those concerned with the handling, preparation, cooking and storage of food. The provision of facilities for the practice and maintenance of such a standard is another important aspect of the problem. The education of workers in strict personal hygiene, in correct methods of handling food, in the storage of cooked foods and in the elementary bacteriology of food poisoning will lose much of its value if the tools to enable them to put these principles into practice are not provided. It was noted by Hobbs (1951) that many kitchens such as those attached to school canteens were catering for double or even treble the number of persons for which they were orginally designed and that in consequence they were overcrowded or understaffed and also short of equipment. In general there was too little space allotted to refrigeration so that left-over foods and meat dishes cooked one day and intended to be eaten cold or warmed up next day were often left to cool overnight in the kitchen at atmospheric temperature. Washing-up methods were usually poor except in newly built school canteens, where thermostatically controlled rinse sinks were installed.

The provision of adequate facilities and staff in school canteens may involve expenditure, particularly where old buildings are involved, but such steps are of importance not only for their immediate effects but as a basis for the long-term education of the children, particularly older girls, in the translation of precept into practice. The need for eradication of faulty methods in the home as well as in public places is borne out by the high proportion of sporadic cases of food poisoning, and instruction of older girls at school, the potential housewives of the future, on the importance of cleanliness in every aspect of the preparation and storage of food is of importance. It is not only in the school, however, that instruction is necessary; the prime means of prevention of food poisoning lies in the continuous education of food handlers in a full appreciation of its causes and of the important role played by scrupulous attention to the prevention of transmission of infection from the person to the food.

If the workers undergo instruction and apply their knowledge, the other side of the problem is the provision of adequate premises and utensils to enable them to do so efficiently. Buildings should be kept free from dust and dirt and protected against vermin. Wash basins must be provided with hot and cold water and a supply of clean towels. The admonition 'Now wash your hands' should be prominently displayed in every water closet. Food and utensils should have protection from flies, and refuse should be removed from the premises and kept in bins with well-fitting covers. The number of outbreaks of food poisoning due to processed or made-up meats points to the need for adequate refrigerator space where dishes cooked the day before and reheated before eating may be stored in conditions which inhibit bacterial growth. Scrupulous cleanliness is essential for all utensils used in the storage, preparation and cooking of food. The use of detergents and of the two-sink system in washing up will mitigate the risk of infection in crockery and cutlery but large containers of the type in use in catering establishments and school canteens require the same meticulous attention as smaller articles. If steam sterilizing is not available they should be washed with boiling water.

Adequate covering should be available in shops for foods on display which are to be eaten without further cooking, and the relative frequency of outbreaks of food poisoning due to trifles, cream buns, custards, and the like, is an index of the faulty handling of these items and of their exposure to bacterial contamination from various sources. The ideal to be aimed at is complete cover for all foodstuffs in shops and restaurants and indirect handling by means of instruments kept scrupulously clean.

CONTROL

The essence of control in an outbreak of food poisoning is a swift detection of the vehicle of infection. It is here that the family doctor can play a vital role in his appraisal of the circumstances leading to the onset of symptoms, in the retention of food remains which may have been implicated, in the prompt notification of cases to the medical officer of health and, if necessary, in the submission of specimens of food, vomit and excreta for bacteriological examination. What appears to be a simple sporadic case of gastroenteritis or a family outbreak may be one incident in a large and widespread epidemic or the forerunner of a series of cases which will occur from further consumption of the contaminated food. The practitioner who acts promptly will enable all the resources of the health department to go into action swiftly, with enhanced opportunities of tracing the source of infection and preventing the onset of further cases. A careful history of the case is of importance in reaching a presumptive conclusion as to the causative organism. Factors common to more than one case, the time of the onset of symptoms, the types of food consumed, the sources of the food or foods suspected, who ate and who did not eat the food available, suspected or

otherwise, will all prove to be valuable items of information to the medical officer of health in his wider investigations.

The investigation and control of an outbreak of food poisoning is an operation involving a team of workers: the medical officer of health, the sanitary inspector, the bacteriologist and the family doctor. As the member of the team most likely to be first on the spot, the last may be said to be the key investigator. Upon the efficiency of the initial action taken by him may rest the success achieved in controlling the outbreak and in the detection of its cause.

SUMMARY

There is no precise definition of the term 'food poisoning' but arrangements exist for the notification to the medical officer of health of patients suffering from gastro-intestinal illness who may be found upon investigation to belong to a group classified as food poisoning in accordance with its bacterial or chemical origin.

Information as to incidence of food poisoning is classified according to a standard pattern and indications over the past four years point to a real increase in the amount of food poisoning in England and Wales.

Chemical poisons are rarely implicated and the overwhelming majority of cases are infective in origin.

Salmonella organisms are responsible for more than twice as many outbreaks as all other types of organism put together and *Salmonella typhimurium* is the most common causative agent in the salmonella group.

In 817 instances in which the vehicle of infection was recorded, meat was the responsible vehicle in 536 outbreaks and in 422 of these it was processed or made up. In 73 incidents trifles, ice-cream, custard, cream buns and other types of sweetmeat were implicated. Of 61 incidents in which eggs were the vehicle of infection, duck eggs were responsible in 47.

In the three years, 1951-53, the total number of deaths reported to the laboratory service was 120, and of these 111 were due to salmonella infection.

The problem of prevention of food poisoning is related broadly to the promotion of a high standard of personal hygiene and to the provision of the necessary conditions and equipment to enable the practice of such a standard.

The essence of control in an outbreak of food poisoning is a swift detection of the vehicle of infection. In this connexion the family doctor may be said to be the key investigator.

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CLINICAL FEATURES OF FOOD POISONING

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THE subject of food poisoning was last reviewed in *The Practitioner* in June 1949. The first article was by Dr. E. T. Conybeare who wrote on 'Food Poisoning—a National Problem'. When we re-read this article and come to review the literature on the subject, we realize that the problem is much more of an international nature, especially when so many of the sources are traced to food imported from abroad. In the same number of *The Practitioner*, Prof. S. J. Hartfall gave a detailed classification of the causes of food poisoning, listing them under the four main headings:—

Contamination of food by bacteria, their spores and toxins.

Poisoning by mushrooms and other poisonous plants.

Fish poisoning.

Chemical contamination.

In that same year (1949) the Ministry of Health simplified the classification so far as this country is concerned. The definition now laid down includes: (1) cases of gastroenteritis caused by certain groups of organisms (such as salmonella); (2) infection with *Cl. botulinum* and *parabotulinum*, and (3) chemical and metallic poisons accidentally contaminating food. The definition is necessarily an elastic one, and must include infection by these same organisms which (especially in children) may reach the alimentary canal by direct bowel to mouth infection. On the other hand, it excludes from the definition of food poisoning the following categories:—

(1) Infections by the Shigella group (which produce the dysenteries), and by *Salmonella typhi* and *paratyphi*.

(2) Infective diseases, even when caused by infected food, such as diphtheria, scarlet fever and tuberculosis.

(3) Infection by various worms (e.g. tapeworm, *Trichinella spiralis*).

(4) Gastro-intestinal reactions due to

(a) poisoning by fungi, plants and vegetables, certain fish or shellfish,

(b) indigestible foods such as unripe fruit,

(c) personal idiosyncrasies and allergies.

Even when limited by this official definition of the Ministry of Health (1949), the number of reported cases in England and Wales recorded in each of the years 1949 to 1953 varied between 5,797 and 10,373—and the number of unrecognized or unreported cases probably far exceeded these numbers.

CLINICAL CLASSIFICATION

The clinical classification of cases is now based almost entirely on the

etiology; that is, on the nature of the infecting organism. In passing, it will be noticed that an older group, listed under the heading of ptomaine poisoning, has been discarded entirely. In the light of present knowledge it is realized that poisonous amines produced by bacterial putrefaction of food probably play no part in causing human disease. In fact it is rarely possible to tell by inspection, smell or taste whether a food is wholesome or not. Whilst a can of tinned food which has' blown' is always the subject of suspicion, it cannot be assumed, without bacteriological testing, that food which appears edible is necessarily free from danger. We are not wise in following the example of the Belgian meat inspector who was so confident of the purity of certain meat that he consumed a portion (de Nobele, 1898)—but he did not survive the test!

Infection of the human gastro-intestinal tract by *Salm. typhi* and *paratyphi*, without clinical manifestations, has been known for a long time. Such persons may have recovered from a recognized or unrecognized attack weeks, months or years previously, or may have been purely passive carriers throughout. It is now known that human beings, animals (including domestic pets and rodents), and ducks in particular, may similarly act as carriers of other salmonella organisms—and by infecting food can be a source of considerable danger. In other words, those infected may themselves have no symptoms of any kind, or may have such few symptoms that they treat themselves and do not bother to consult a doctor.

When symptoms of any magnitude do arise, experience has shown that there is a broad correlation between the symptoms produced and the type of infection. The principal organisms incriminated so far, in approximate order of frequency, are:—

(1) Salmonella. In recent years these have been found in 50 to 60 per cent. of outbreaks in England and Wales. The *Salm. typhi-murium* (previously known as *B. aertrycke*) has been found to be responsible for two-thirds to three-quarters of all proven salmonella infections, not only in this country, but the world over.

(2) *Staphylococcus aureus* (coagulase positive) accounts for about 2 per cent. of outbreaks. In spite of the large number of different types of this organism, phage typing has revealed that only 3 or 4 types produce enterotoxin (which causes the symptoms)—and nearly 80 per cent. of cases are caused by the toxin produced by one particular phage type.

(3) *Cl. perfringens* (previously known as *Cl. welchii*) accounts for only 0.5 per cent. of outbreaks.

(4) Other organisms which are even more rarely encountered are *Strep. fæcalis*, *B. proteus*, *B. cereus*, *E. coli* and *E. paracoli*.

(5) A large group of cases has as yet revealed no specific causal agent, even after careful investigation of a considerable number of cases in a particular epidemic. These form 37 to 48 per cent. of the total outbreaks recorded by the Ministry of Health in 1950-53, listed as 'causal agent not

discovered'. Some are possibly due to viral organisms (Reimann *et al.*, 1945), accounting for epidemics described as 'epidemic nausea' (Bradley, 1943), 'viral dysentery' and 'winter vomiting disease'. During 1952-53, 39 and 43 outbreaks of 'winter vomiting disease' were reported in England and Wales.

(6) Botulism is fortunately rare. It differs from the infections discussed above in that gastro-intestinal symptoms are of minor importance compared with the manifestations in the central nervous system.

(7) Chemical causes are rarely met, due in large measure to the Food and Drugs Act, 1938. In fact only five cases have been reported in England and Wales in the last four years.

The clinician, faced with a patient presenting symptoms suggestive of food poisoning, is wise to call in the help of the pathologist at as early a stage as possible. Cultures from the vomitus and the stool, often also from the nose or the fingers, combined with investigation of any suspicious source of infection by the public health authorities, will reveal the cause in two cases out of every three. Meanwhile a clinical classification of the main presenting symptoms may help point to the origin.

SALMONELLA INFECTIONS

The commonest cause is a salmonella infection. In a case of moderate severity the presenting symptoms are a rather sudden onset with diarrhœa, combined with abdominal colic. The stools are loose, soon become watery and often offensive: some degree of dehydration may follow. Nausea and vomiting are not always present, but headache is usual and may be severe for the first day or so. There is malaise and fever (up to 100° F. [38° C.]). The temperature remains raised for two to five days, and recovery is relatively slow, the patient taking ten to fourteen days to get well.

The disease is due to a true bacterial infection, and like its counterparts, typhoid and dysentery, the infecting organism multiplies freely in the small and large intestine. In a still more severe case chills and even rigors may occur, for the organism may invade the blood stream and produce localized abscesses, cholecystitis, meningitis, or endocarditis. Some cases bear a close resemblance to paratyphoid fever (Rep. Min. Hlth, 1950) except that recovery is more rapid.

The severity of the illness varies greatly from case to case, and is always worse in the very young and the elderly: in fact the case mortality of 2 to 3 per thousand is almost entirely limited to these ages (Seligmann *et al.*, 1946). A high proportion of cases are sporadic, and not related to other cases reported (Wilson, 1949), although outbreaks inside families or in localized areas may occur. It is then noticeable also that the incubation period varies from case to case, and is usually within twelve to twenty-four hours of partaking of the infected food. A large variety of different foods may carry the infection, chief among which are processed meats, sweetmeats such as custard and ice-cream, and duck eggs. In fact, during and just after the 1939-45 War imported spray-dried duck eggs were particularly troublesome in this respect.

After infection, both in clinical cases and in carriers, the organism may persist in the intestine for up to nine weeks.

STAPHYLOCOCCAL FOOD POISONING

When the disease affects a number of members of the community and produces severe diarrhœa and vomiting with prostration in the course of an hour or so, the cause is probably staphylococcal food poisoning—caused by a toxin derived from a profuse growth of *Staph. aureus* in the food before ingestion. A classical instance, not previously recorded, fell to my professional lot in March 1943.

During manœuvres an army unit of 106 men was offered a breakfast at 7.0 a.m., consisting of 'bully-beef' and mashed potatoes. To save time in the morning, the cook and assistant cook had prepared the meal on the previous evening and put it in a 'hay-box' to keep warm overnight. While in the field the men rapidly became ill, starting at 9.30 a.m., and by 11.30 a.m. all were prostrate. They had very severe diarrhœa and vomiting, with abdominal colic, and rapidly became so ill that they lay on the ground and many thought they would die. They were collected and brought by ambulance to the nearby E.M.S. Hospital at Ashridge in Hertfordshire. When seen they were obviously very ill: those who had severe early vomiting had less diarrhœa than those whose vomiting started rather later. They were prostrate with severe abdominal colic, and muscle cramp in the limbs and abdominal wall: one patient had typical carpo-pedal spasms and other signs of tetany. Most men had a temperature of 100° F. (38° C.), and some of 101° F. (38.3° C.), with a pulse rate raised in proportion to the temperature. Treatment consisted in giving to the more severe cases an intravenous drip of glucose-saline. Recovery in most cases was very rapid, the majority being out of hospital, and playing football, on the third day. Three were in hospital for a total of two weeks with a coincident bronchitis. The cause was traced to a *Staphylococcus aureus* infection of the assistant cook: a pure growth of the organism was obtained from his chronically discharging ear (due to otitis media) and from a small whitlow on one of his fingers. The organism from these sources was phage-typed and proved to be the same as the *Staph. aureus* cultured from the vomitus and the stools of a number of the patients. The only two men, of the 106, who were not involved were the two who did not consume any part of the meal: the cook, and the sergeant who 'never could eat things like that'!

This outbreak illustrates the essential features of staphylococcal food poisoning: symptoms come on very suddenly within 2 to 4 hours of ingestion, vomiting and diarrhœa are almost continuous for a few hours, with thirst, collapse and dehydration, a low blood pressure, an appearance of impending death, and characteristically 'the patient loses all sense of values and does not care whether he lives or dies'. Yet recovery is equally rapid and usually complete in one to two days. The primary source of the organism is usually in the nose or on the finger of the cook who infects the food: the food involved often contains pressed beef or brawn and has been heated and probably been allowed to cool slowly—i.e. is likely to be of large bulk prepared as in a restaurant or school. The food must be heavily infected and it has been suggested that to produce clinical symptoms there must be in each gramme of food 500,000 colonies of an appropriate strain (Allison, 1949). Since the toxin is not destroyed by ordinary methods of cooking, in the outbreak which I have described it would not have been destroyed even if the food had been more thoroughly cooked before serving.

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STAPHYLOCOCCAL FOOD POISONING

When the disease affects a number of members of the community and produces severe diarrhœa and vomiting with prostration in the course of an hour or so, the cause is probably staphylococcal food poisoning—caused by a toxin derived from a profuse growth of *Staph. aureus* in the food before ingestion. A classical instance, not previously recorded, fell to my professional lot in March 1943.

During manœuvres an army unit of 106 men was offered a breakfast at 7.0 a.m., consisting of 'bully-beef' and mashed potatoes. To save time in the morning, the cook and assistant cook had prepared the meal on the previous evening and put it in a 'hay-box' to keep warm overnight. While in the field the men rapidly became ill, starting at 9.30 a.m., and by 11.30 a.m. all were prostrate. They had very severe diarrhœa and vomiting, with abdominal colic, and rapidly became so ill that they lay on the ground and many thought they would die. They were collected and brought by ambulance to the nearby E.M.S. Hospital at Ashridge in Hertfordshire. When seen they were obviously very ill: those who had severe early vomiting had less diarrhœa than those whose vomiting started rather later. They were prostrate with severe abdominal colic, and muscle cramp in the limbs and abdominal wall: one patient had typical carpo-pedal spasms and other signs of tetany. Most men had a temperature of 100° F. (38° C.), and some of 101° F. (38.3° C.), with a pulse rate raised in proportion to the temperature. Treatment consisted in giving to the more severe cases an intravenous drip of glucose-saline. Recovery in most cases was very rapid, the majority being out of hospital, and playing football, on the third day. Three were in hospital for a total of two weeks with a coincident bronchitis. The cause was traced to a *Staphylococcus aureus* infection of the assistant cook: a pure growth of the organism was obtained from his chronically discharging ear (due to otitis media) and from a small whitlow on one of his fingers. The organism from these sources was phage-typed and proved to be the same as the *Staph. aureus* cultured from the vomitus and the stools of a number of the patients. The only two men, of the 106, who were not involved were the two who did not consume any part of the meal: the cook, and the sergeant who 'never could eat things like that'!

This outbreak illustrates the essential features of staphylococcal food poisoning: symptoms come on very suddenly within 2 to 4 hours of ingestion, vomiting and diarrhœa are almost continuous for a few hours, with thirst, collapse and dehydration, a low blood pressure, an appearance of impending death, and characteristically 'the patient loses all sense of values and does not care whether he lives or dies'. Yet recovery is equally rapid and usually complete in one to two days. The primary source of the organism is usually in the nose or on the finger of the cook who infects the food: the food involved often contains pressed beef or brawn and has been heated and probably been allowed to cool slowly—i.e. is likely to be of large bulk prepared as in a restaurant or school. The food must be heavily infected and it has been suggested that to produce clinical symptoms there must be in each gramme of food 500,000 colonies of an appropriate strain (Allison, 1949). Since the toxin is not destroyed by ordinary methods of cooking, in the outbreak which I have described it would not have been destroyed even if the food had been more thoroughly cooked before serving.

CLOSTRIDIUM INFECTIONS

A comparatively rare type of enteritis follows the ingestion of meat in restaurants and other communities. Symptoms are mild and after an incubation period of 10 to 18 hours there is abdominal colic and diarrhœa, without pyrexia and usually without vomiting. Although more severe and sometimes lethal in the aged, probably many cases are missed. The cause may well be infection of the meat by certain heat-resisting strains of *Cl. perfringens* (*Cl. welchii*). When meat has to be consumed many hours after cooking, rapid cooling should be the rule, preferably in a refrigerator, if such occurrences are to be avoided (Rep. Min. Hlth, 1951a).

OUTBREAKS DUE TO OTHER ORGANISMS

Another cause of widespread outbreaks (with many victims) has more recently been recognized. The attacks come on 8 to 16 hours after the suspected food has been consumed: symptoms are mild, with little or no nausea and vomiting, and without severe intestinal colic or diarrhœa. Bacterial examination of any materials vomited, and of stools, has shown a very heavy bacterial flora of organisms normally believed to be non-pathogenic: such are *E. coli* and *paracoli*, *Strep. fæcalis* (Buckbinder *et al.*, 1948), *Proteus vulgaris*, *Aerobacter aerogenes* and *B. cereus* (Hange, 1950; Christiansen *et al.*, 1951). The degree of infection of the foods consumed is very heavy before symptoms are produced, but that such is possible is proved by feeding experiments on volunteers (Meyer, 1953). A causal relationship of certain strains of *E. coli* to neonatal and infantile diarrhœa is possible, and is being further investigated (Rep. Min. Hlth, 1951b).

OUTBREAKS OF UNKNOWN ETIOLOGY

As has already been mentioned, there is still a large group of cases (comprising some 40 per cent. of all outbreaks investigated), in which no satisfactory explanation as to the cause is forthcoming. A number of these outbreaks are fairly sudden, and are particularly liable to affect school children. Headache, giddiness, nausea, vomiting, diarrhœa and abdominal pain are associated with transient pyrexia to 100° F. (38° C.). General practitioners have long been tempted to label these cases as 'gastric influenza' (Warner, 1950), implying an upper respiratory infection of virus origin, a view which is now supported by official investigations of the Ministry of Health (Bradley, 1943; Rep. Min. Hlth, 1951c). The symptoms are almost invariably short lived and a rapid recovery is the rule.

TREATMENT

The treatment of all these varieties of gastroenteritis is on similar lines. The patient should be put to bed, and given the usual nursing care. It is unwise to attempt to suppress vomiting or diarrhœa, at least in the earlier stages, for these represent nature's method of eliminating the cause of the

disease. On the other hand, progressive dehydration must be checked and, if severe, 5 per cent. of glucose in normal saline may be needed (2 to 3 litres in 24 hours) intravenously. When collapse is present, especially in the young and the elderly, nikethamide by injection and even plasma transfusion may be required. As soon as they can be tolerated, fluids to the choice of the patient should be administered by mouth.

There is no evidence that sulphonamides or the antibiotics help to diminish infection in the intestine, and neither do they help to rectify a subsequent carrier state. Their use is only justified in the rare cases in which the infecting organism has invaded the blood stream.

At all times, the vomitus and the stools will need to be treated on the same lines as would be used for cases of typhoid fever, and all in attendance must adopt similar measures for their own self-protection.

BOTULISM

An entirely different type of food poisoning manifests itself in the form of the neurological symptoms and signs of botulism. The earlier symptoms of giddiness are soon followed by diplopia, dysphagia, considerable dryness of the throat and difficulty in speaking. With this there is internal and external ophthalmoplegia, ptosis of the lids and, later, general asthenia and respiratory paralysis. The symptoms of gastroenteritis are not seen: in fact, constipation is more usual. The illness is apyrexial throughout. Happily this condition is rarely seen in Great Britain. The symptoms are not primarily due to the varieties of *Cl. botulinum* or *Cl. parabotulinum*, but to the toxins they produce: these block the release of acetylcholine at the myoneural junctions, producing motor paralysis but no sensory effects.

The recommended treatment is with large doses of antitoxin, but, to be effective, this must be given early.

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HOW TO DEAL WITH AN OUTBREAK OF FOOD POISONING

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THERE are many points of similarity between the investigation of an outbreak of food poisoning and the investigation by the Criminal Investigation Department of Scotland Yard of a case of murder, but in some respects the urgency is greater in the case of the outbreak of food poisoning. The average murderer usually kills only one person, and it is rare for him to succeed in felling several victims; but the food poisoner, though blameless in intent and unaware of the results of his actions, may succeed in killing a large number of persons, and in causing many hundreds of fellow-citizens to suffer from a painful and unpleasant illness. The ice-cream vendor in Aberystwyth who sold his wares on a public road did so in all innocence, but at least four persons died and about 200 other persons suffered a severe and prolonged illness. More unfortunately still, in Bournemouth in 1936, failure to keep *Salm. typhi* out of a dealer's milk resulted in 518 cases of typhoid fever and 51 deaths.

Usually the picture is less gloomy, and most cases of food poisoning result merely in invalidism. The loss to the community, however, the danger of spread to many other victims, and the distress caused to the patients make the control of food poisoning a matter of urgency and importance.

The basis of the investigation of food poisoning rests on the need for accurate knowledge and sound deductions, and in no branch of medicine is it more important that the knowledge should be accurate and the deductions should be sound. A further need is speed.

THE ROLE OF THE GENERAL PRACTITIONER

In most cases the general practitioner is the first person to become aware of the possible existence of either a case or an outbreak of food poisoning, and in the majority of cases it is not difficult for him to come to the conclusion that the illness with which he is dealing has, in fact, been caused by a food infection. His first duty therefore is to prove that his patient is really suffering from a food infection, and to ascertain the exact time of onset. The next step is to find out the vehicle of infection, and this should be followed by inquiries directed to finding the causal agent, whether bacterial or toxic. The final steps are possibly outside the province of the general practitioner but are equally important, namely, to trace the path of infection and to take the necessary measures to stop the outbreak.

Food poisoning is notifiable under Section 17 of the Food and Drugs Act,

1948, and the practitioner therefore should immediately get in touch by telephone with the local medical officer of health. In the meanwhile he should make as complete inquiries as possible on the spot. It should be emphasized from the outset that the investigation and control of an outbreak of food poisoning are almost always a matter of team work, and unless the general practitioner can be quite satisfied, and this is rare, that the outbreak is, and will continue to be, confined to one or two members of the family, then he will require the resources of the public health department and the public health laboratory service to trace the cause, and prevent its spread.

WHEN TO SUSPECT FOOD POISONING

The primary features of a case of food poisoning are vomiting, abdominal pain and diarrhœa, although these may be varied according to the cause, the intensity of the infection, and the resistance and general health of the sufferer, but in any case the general practitioner should have in the forefront of his mind the possibility of a food infection when he is called in to see an otherwise healthy person who is vomiting, particularly if the vomiting is associated with abdominal pain. The probability of the illness being due to a food infection is intensified, if not confirmed, by the simultaneous illness in more than one member of the family who has contracted the same type of illness at the same time. It is, however, at this stage that the family doctor may be led astray by the patient's previously conceived ideas about the cause of food infections, and it is imperative that the doctor should keep an open mind about the vehicle of infection. It is only too easy to assume that if the family have consumed ice-cream, sausages or other processed meat, or duck eggs, the diagnosis has been made and that one or other of these foods is the cause of the infection. This can be particularly misleading when the illness is due to staphylococcal infection and not to a salmonella infection. Inquiries should therefore be made about each individual item in the diet of every member of the family, with particular reference to the amounts consumed by each person. As the family doctor is first on the scene, he may be able to save some samples of the suspected food before they are thrown out, and this is much easier to do than is commonly thought. The bacteriologist is satisfied with very small scraps, and can often do much with the mere remains or scraps left on a plate. It is even possible to retrieve an empty tin from the dustbin, and the doctor should never accept the assurance of the patient that all the food has been eaten.

TOXIN OR BACTERIA?

There are two types of food poisoning, the epidemiology of which is entirely different, and it is essential to get some idea as to which type of outbreak is in question. The inquiries and procedure to be adopted in the case of a toxin outbreak of disease such as staphylococcal food poisoning are rather different from those applicable to the control of a bacterial food infection due to the salmonellæ or to *Cl. welchii*. Fortunately, the incubation period gives much

help in this matter. It is obvious that if the preformed toxin is ingested it will act on the lining of the stomach within a relatively short period of time, and the incubation period of staphylococcal food poisoning is usually therefore brief. Indeed, it is rather surprising that it is seldom less than two hours, and usually extends to from two to twelve hours. If, however, the infection is due to a salmonella or clostridium the organisms will require time to grow to numbers sufficient to produce enough toxin to cause symptoms, and the incubation period will be considerably longer, say from twelve to thirty-six hours. In other words, if a patient has taken the suspected food only three or four hours ago it can *almost* be assumed that it is staphylococcal. One hesitates to be dogmatic on this point, as it is possible for a salmonella infection to cause early symptoms if the organisms have had an opportunity of growing freely on the incriminated food for sufficiently long, and at a suitable temperature, to produce a large amount of toxin.

STAPHYLOCOCCAL FOOD POISONING

Let us assume for the moment, however, that the incubation period is short and a tentative provisional diagnosis of staphylococcal food poisoning is made. Staphylococcal food poisoning is usually caused by infection of the food from the hands of the food handler. The hands are infected by the coagulase-positive staphylococcus either through a skin infection, such as a boil, carbuncle or impetiginous eruption, or by contact of the hand with an infected nose, the latter being the commoner. Infection can also be caused by sneezing or coughing directly on to the food. All the contacts should therefore be examined for staphylococcal lesions of the skin, including especially the hands and the face. The nose should never be forgotten, and in all cases nasal swabs should be taken and sent to the laboratory.

The next item of importance in the inquiry into the cause of the food poisoning, which is suspected of being staphylococcal in origin, is the investigation into the methods of preparation of the food. Staphylococcal food poisoning can only occur if three conditions are present at the same time. The first of these is the existence of the organism on the hands of the person. Perhaps this is a little dogmatic, as it is possible for a nasal carrier to sneeze on food, but it is undoubtedly more common for the food to be contaminated by the hands. The second condition which must be investigated is the opportunity for the organism to grow, and for this time is necessary. If a carrier of the staphylococcus infected food directly, and the food were immediately consumed, no illness would occur. Several hours are necessary, under conditions suitable to the growth of the organism, for sufficient toxin to be formed. A large number of cases of food poisoning incriminate a food which has been prepared beforehand, and left aside for consumption several hours later, and the possibility of this having been the course of events must always be inquired into. The third condition is the existence of a temperature suitable for the growth of the organism. If a processed food is infected by a food handler and immediately placed in a re-

frigerator and taken out of the refrigerator only to be eaten immediately, food poisoning is not likely to occur. There are thus three causal factors: the infection of the food, the time lag necessary for the organism to grow, and the suitable temperature. In many homes there is no refrigerator, and the temperature is nearly always suitable. In canteens, however, it is quite possible for up-to-date refrigerators to be employed and yet for infection to take place because of inadequate refrigeration.

An example of this occurred in a Midland town fairly recently when more than 100 persons suffered from an outbreak of staphylococcal food poisoning where conditions in the canteen were excellent, and where a large, smoothly working refrigerator was installed. The refrigerator, however, was sited in the kitchen itself, the temperature of which was very high, and a maximum and minimum thermometer placed in the refrigerator for twenty-four hours showed that, although there was snow on the ground outside and the outside temperature was below 32° F. (0° C.), during the entire period, the temperature within the refrigerator never fell below 32° F. (0° C.) and for a portion of the twenty-four hours rose to 56° F. (13.3° C.). The refrigerator was moved to a more suitable position.

SALMONELLA FOOD POISONING

Salmonella food poisoning is more common than staphylococcal food poisoning, and the family doctor will early direct his attention to the possibility of the infection being bacterial. He will have in the forefront of his mind the necessity for proving the presence of the organism, and as this is a matter for the bacteriologist he will see that specimens are available for bacteriological examination. Such specimens should include the remains of any suspected material, such as tinned food, duck eggs, sausages or other processed meat, ice-cream, cream buns, or the remains of the meal sticking to the plates and dishes, if any such remain. It is difficult to make a suitable compromise between sending an enormous number of samples and sending so few that the actual incriminated food may escape. In addition to samples of the suspected food, fæcal samples are absolutely necessary. The simplest and most convenient method of collecting the latter is by fæcal swabs, but in practice it is easier to obtain from a patient a specimen of his fæces than to obtain his permission to take a rectal swab. Specimens should be taken from the fæces of all members of the family and not merely those who have been ill. It is more than possible that the guilty person may be a carrier who is herself free from the disease. Specimens of vomit should also be collected in sterilized containers. All specimens should be sent to the laboratory as rapidly as possible, either by the practitioner himself in his own car, or by the public health department's transport. If there is likely to be much delay they should be kept in an ice-box. Facilities of this nature will be supplied by the public health department.

Salmonella infections are often caused through the infection of food by rats, who are prolific carriers of salmonella organisms, and preliminary investigations should be made into the presence or absence of rodents in the home or canteen.

By the time these inquiries have been made, the investigators will almost

certainly be a team, including a doctor from the public health department, and further investigations will call for the cooperation of the family doctor, the public health medical officer, the food inspector and last, but not least, the bacteriologist from the laboratory service. The bacteriologist should be given full particulars of the outbreak at the earliest opportunity so that when the specimens arrive he will have a full history of the outbreak, and will not waste time in carrying out unnecessary observations. He should be informed by telephone, and in return he will give early information about the results of the swabs by telephone.

THE ROLE OF THE PUBLIC HEALTH DEPARTMENT

In the majority of cases the general practitioner has carried out most of his work at this stage, and further investigations to prevent the spread of the infections and to control the existing epidemic will be taken by the medical officer of health, especially if several families, or a large number of persons in a canteen, are affected. It is, however, desirable that the family doctor should be acquainted with the procedure which the medical officer of health will adopt to ascertain other cases and to check the outbreak.

In many cases, the outbreak will not be confined to one family, and it may well be that the infected food has been supplied by a food supplier from a butcher's shop, a canteen, a grocer and so forth, and the public health officer will follow the incriminated food back to its source. He will seek from the vendor a list of customers who have purchased the suspected food and, although there is no obligation on the vendor to supply this information, it is usually readily forthcoming. With this information in his possession he will carry out visits to find out how many, if any, other consumers have taken ill. If there are no other victims, then he will have reason to suspect that the food has been contaminated in the house or canteen where it has been consumed. If, however, the vendor's list shows a number of persons in different parts of the town who have also fallen ill it will be obvious that the food has been infected before sale *or during delivery*, and the health department officers will seek to trace its course. Their investigations will be much the same as those described above for the family. In the case of staphylococcal food poisoning they will seek a person who is suffering from staphylococcal infection, or who is a carrier of the organisms. In the case of salmonella infections they will take rectal swabs or specimens of fæces for bacteriological examination. They will inspect the hygienic conditions at the place of preparation of food, with special reference to unhygienic practices which are likely to make food infection easier. The supply of constant hot water for washing purposes, the cleanliness and ease of working in the store or shop where the food is prepared, the extent and siting of the refrigerator, and the presence or absence of rats will be carefully noted.

Careful investigations are made into the bacteriological health not only of the food handlers on the premises of the shop or canteen, but of those persons who have been employees and are now away, either on holiday or

through illness. Only too often is a source of infection missed because the offending carrier has been absent from the shop or canteen at the time of investigation.

SUMMING UP

We may sum up by reiterating that food poisoning is primarily due to the combination of three factors: namely, the existence of the organism, time to enable the organism to grow, and temperature to encourage rapid growth. There is, however, another factor which is of vast importance, particularly in canteens and establishments where food for more than one family is prepared. This factor is that of personal hygiene. Apart from sneezing in the case of staphylococcal food poisoning, it must be emphasized that both in the case of toxin poisoning and in the case of bacterial poisoning, the food is almost always infected by the human hands. The human hands will not infect food if they are kept clean, and hence the need for strict attention to personal hygiene. It is not enough to have available to the food handler a sink, a tap and a towel. It is essential that constant freely flowing hot water with a generous supply of towels should be immediately available in close proximity to the room in which the food is prepared. There must be a wash basin with hot and cold running water close to the toilet, and food handlers should be instructed to wash their hands every time they come from the toilet. This is absolutely fundamental, and its neglect is the basis of most cases of food infection. This is not enough, however. The hands are very easily infected, and a person who approaches food with the intention of touching it should, no matter what the circumstances, always ensure that his or her hands are clean. In other words, it is essential that the hands should be thoroughly washed both after going to the toilet and on all occasions before handling food.

The methods of drying the hands in most canteens is unsatisfactory. The roller towel, unless provided in large numbers, is apt to become a sodden dirty rag at the end of the day. Paper towels are ideal in principle, but unsatisfactory in practice. They are not agreeable to use, and it has been found that the standard of hand washing will fall if only paper towels are provided. Electric dryers are reasonably cheap and are satisfactory in large canteens. Some food handlers, however, complain that they are apt to dry up the hands too much. The ideal is a plentiful supply of individual clean white towels.

Next to personal hygiene is the necessity to avoid the preparation of made-up dishes. If stews, minces and sausages must be prepared beforehand, meticulous attention should be paid to their preparation, and in no circumstances should they be allowed to remain at room temperature after their preparation. They should immediately be placed in the refrigerator. Finally, the refrigerator should be placed in such a position that it is not constantly exposed to blasts of hot air whenever opened, and if the canteen is so large that the refrigerator must be opened on numerous occasions, an additional refrigerator should be supplied to contain those foods which are easily contaminated.

THE BACTERIOLOGY OF FOOD POISONING

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It is proposed to limit discussion to acute bacterial food poisoning, in which the organisms actually multiply in the food, and to exclude those conditions in which the food merely acts as a vehicle, as, for example, watercress in the spread of typhoid fever.

CLASSIFICATION

It is useful to distinguish between the type of food poisoning in which the bacteria set up an infection in the body, and the type in which the victim suffers from the effects of toxin already formed by multiplication of the organisms in the food, since these types have different clinical and epidemiological features. The most common causes of the infection and toxin types are salmonellæ and *Staph. pyogenes*, respectively. It will then be necessary to consider *Clostridium welchii*, recently established with some certainty as a fairly frequent cause of mild food poisoning, and a number of other bacteria of whose significance it is less easy to be certain. Finally, the bacteriological aspects of botulism, which differs entirely from these types in its clinical and other manifestations, will be briefly discussed. It may be stated that food poisoning is no longer properly ascribed to ptomaines—a loosely used term for certain late products of putrefying animal and vegetable matter.

The frequency of the different types in England and Wales can be judged from the reports of the Public Health Laboratory Service which is interested epidemiologically in *incidents*, each outbreak, in the community or in a family, and each sporadic case being considered as a unit. In 1953 (Report, 1955a), of the 3,277 incidents in which the cause was discovered, 3,114 were due to salmonellæ, 132 to staphylococci, 25 to *Cl. welchii* and six to other organisms. It must be remembered, however, that isolated cases make a much larger contribution to the total of salmonella incidents than they do to the other types.

SALMONELLA FOOD POISONING

In this type of food poisoning living organisms that have multiplied in the food are ingested and initiate an infection in which symptoms appear after an incubation period of six to forty hours (usually twelve to eighteen hours). Onset is sudden, and the main manifestations are vomiting, diarrhœa, and colic, with a little fever. The illness usually lasts less than a week, but severe

toxæmia and dehydration, or complications such as septicæmia and meningitis, occur in a very small proportion of cases and may prove fatal—46 deaths were attributed to salmonella infection in the 1953 report.

The salmonellæ are gram-negative, usually motile, bacilli recognized by the bacteriologist by their appearance on culture media, their behaviour in biochemical test media and their reactions with specific antisera. By agglutination tests with a battery of antisera their H (flagellar) and O (somatic) antigenic structure can be defined, and well over 300 serological types have now been named. A few of these organisms have strongly invasive properties and produce the bacteriæmic 'continued fever' infection characteristic of enteric fever. Our present interest is in those in which irritant rather than invasive qualities predominate. A large dose, such as may be attained by multiplication in a suitable food, is required to produce infection, and illness takes the form of gastroenteritis.

Animals—mainly rodents, poultry and pigs—form an important reservoir of salmonellæ and, since some types are specially associated with certain animals, precise identification of the infecting organism in any case may give a useful clue to the origin of the infection. The other source of these organisms is the alimentary tract of infected human beings, either convalescent cases, persons with mild or symptomless infections or, occasionally, chronic excretors.

Types of salmonellæ.—In recent years over 80 named salmonella species have been incriminated as the cause of cases or outbreaks of food poisoning, but many of these were responsible for single incidents. The following are among the more frequently encountered types:—

Salm. typhi-murium (formerly known as *Bact. aertrycke*) is by far the most common type and has been responsible for 70 to 80 per cent. of the salmonella food-poisoning incidents in this country in recent years. It is a natural pathogen of rats and mice, in which it causes mouse-typhoid, and the droppings of these rodents may contaminate foodstuffs exposed in stores and kitchens. The organism has also often been found in the fæces of domestic and farm animals, including dogs, cats, pigeons, poultry and cattle. It may be present in duck eggs, which must be boiled for at least 15 minutes, or cooked at high temperatures, in order to destroy it.

At a large London hospital, about 60 patients and 147 members of the staff suffered from *Salm. typhi-murium* food poisoning traced to a 'queen of puddings' made with 200 duck eggs, of which the yolks were baked with the other ingredients and the whites, whipped with sugar, were poured on top and lightly browned (Garrod and McIlroy, 1949).

By means of specific bacteriophages *Salm. typhi-murium* strains can be assigned to a number of phage types. Identification of type may be of value in epidemiological detective work.

In a residential hostel 79 persons fell ill with food poisoning due to *Salm. typhi-murium* of phage-type 3b, the probable vehicle being sandwiches of potted meat and reconstituted dried-egg. The same type was isolated from trapped mice on the

premises which might have infected the first human case thought to be responsible for the main outbreak.

Salm. enteritidis (Gaertner's bacillus) is also found in wild rodents and in duck eggs. The *danysz* variety, which is sometimes used in preparations for destroying mice and rats, has been responsible for human infections. There are three other varieties, of which *jena* is the most common.

Salm. thompson is a common cause of disease in young chickens and has been isolated from other domestic animals.

Salm. dublin is the cause of a diarrhœal illness in calves and is the most common salmonella of cattle, which may have an acute diarrhœal illness or, more often, may be symptomless carriers. The isolation of this organism from cases of food poisoning must thus always suggest the possibility of milk-borne infection.

About 600 children in schools in and around Chard, Somerset, developed symptoms due to *Salm. dublin* after drinking unpasteurized T.T. milk. A recently calved cow in the herd concerned was excreting the organism in the milk and fæces (McCall, 1953).

Salm. choleræ-suis, associated especially with infection in swine, is notable for its invasive qualities. It is liable to give rise to septicæmia and purulent complications.

Other common types are *Salm. bovis-morbificans*, *Salm. newport*, *Salm. anatum*, *Salm. bareilly*, *Salm. oranienburg*, *Salm. montevideo* and *Salm. minnesota*.

Sources and vehicles of infection.—Most outbreaks of salmonella food poisoning are conveyed by meat dishes, usually processed or made up. Often they are cooked meats prepared by factories or retail shops and eaten cold, or preparations made a day or more before they are required and stored in the larder. The meat, often pork or beef, may be derived from infected animals or may be contaminated after slaughter from other sources, such as rodents or human hands. A single infected carcass may contaminate slaughterhouse implements and butchers' slabs, and thus convey widespread infection through the medium of meats such as corned beef eaten without further cooking. This was probably the mechanism of an outbreak of *Salm. typhi-murium* infection in Essex with nearly 4000 victims (Camps, 1947). Salmonellæ in, for example, sausages may survive light cooking such as frying for fifteen minutes.

Eggs are often incriminated. In ducks, whose eggs are much more liable to infection than those of hens, salmonellæ may be transmitted to the egg as a result of ovarian infection. This happens very rarely with hens. In eggs soiled with fæcal matter salmonellæ, in suitable conditions of warmth and moisture, may penetrate the shell and survive for many months. In a recent survey (Report, 1954a) it was estimated that some 187,000 infected duck eggs were probably sold to consumers in 1950 in this country, many of them to be used in mayonnaise, custards and meringues. The liquid or

frozen egg of commerce, which may also convey salmonellæ, poses special problems due to the pooling of large batches of eggs and the possibility of contamination of the processing plant (Report, 1955b). The appearance in Britain about 1940 of many new or foreign 'exogenous' types of salmonella was associated with the large imports of American spray-dried egg, 9.9 per cent. of 7,584 samples being found to contain salmonellæ belonging to 33 types (Report, 1947). The organisms were present in small numbers and most incidents resulted from the dried egg being reconstituted and allowed to stand for some hours in a warm place, favouring rapid bacterial multiplication. Between 1942 and 1945 the Ministry of Food imported 244,000 tons of dried egg.

In tropical countries remarkably high salmonella infection rates have been reported in house lizards (Mackey, 1955) but, although many of the recorded types have been isolated from man in the same areas, the part played by lizards in human infection is uncertain.

Other vehicles in which salmonellæ can grow freely are milk and synthetic cream. These and other foodstuffs may be contaminated from the various animal sources mentioned above, or by the hands of human excretors.

STAPHYLOCOCCAL FOOD POISONING

Certain staphylococci, multiplying in a suitable medium, form an enterotoxin capable on ingestion of producing violent vomiting and other symptoms of food poisoning. Since the toxin is preformed in the food the incubation period is short, usually ½ to 6 hours, and the illness is brief and acute. Recovery is rapid and fatalities are rare. The organisms concerned belong to the potentially pathogenic species, *Staph. pyogenes*, which the bacteriologist identifies by its ability to coagulate human or rabbit plasma. The coagulase test can be done in a few minutes on a slide or in a tube. Not all strains of *Staph. pyogenes* can produce enterotoxin, for which there is unfortunately no good test. Tests in kittens and monkeys have been used, and more elaborate tests on the bench have been examined (Kelsey and Hobbs, 1954), but none of these has proved completely reliable, and the use of the human volunteer, employed on a number of occasions, has obvious limitations. In a few specialist laboratories strains can be defined serologically and can be assigned to a particular phage type according to their sensitivity to a set of bacteriophages. A report may thus refer to a strain as, for example, *Staph. pyogenes* phage-type 53, and may include the comment that this is a type commonly encountered in association with food poisoning. The significance of the strain would therefore be strengthened, especially if organisms of the same type were isolated from the vomitus of the patient, the suspected foodstuff and the possible source of infection.

An important point is that enterotoxin is heat stable and may retain its potency in foods in which the organisms themselves have been destroyed by cooking.

Sources and vehicles.—Staphylococci are ubiquitous, and swabbing of any sample of the adult population would probably reveal over half of them to be carrying *Staph. pyogenes* in the nose and about a quarter of them on the hands, although these would not necessarily be enterotoxigenic types. Boils, purulent discharges from the ears, infections of the upper respiratory tract and cuts on the fingers or hands, whether obviously septic or not (Allison, 1949), may be prolific sources of pathogenic staphylococci. Tables, knives and aprons in a slaughterhouse have been shown to be heavily contaminated (Ludlam, 1952). Most outbreaks have been due to processed or made-up meats, gravies, canned meats (infected by handling after the can was opened) and sweetmeats. After contamination, the food must have been kept in the relatively warm conditions suitable for bacterial multiplication. Counts of at least a million staphylococci per gramme, and often much higher, are usual in incriminated foodstuffs.

An outbreak involving the families of a butcher and his neighbour in Sheffield was traced to ox tongue eaten one or two days after cooking. The tongue contained over 1000 million coagulase-positive staphylococci per g., and similar organisms were obtained from the fæces of the victims, the nose and hands of the butcher's wife, and a cut on the butcher's hand. All the strains examined belonged to phage-type 53 (Millar and Pownall, 1950).

Another possible source of pathogenic staphylococci is the cow with this form of mastitis.

In Whitby R.D., 75 persons including 49 children in two schools became ill after drinking milk from one source. *Staph. pyogenes* of the same phage type was isolated from the milk, from a recently calved cow with mastitis and from dairy equipment on the farm (Report, 1954b).

Cl. Welchii FOOD POISONING

In recent years the observations of Hobbs, Smith, Oakley, Warrack and Cruickshank (1953) have established that certain strains of *Clostridium welchii* may be the cause of food poisoning, often in schools and canteens. They reported 23 such outbreaks in the London area. The incubation period of eight to twenty-two hours is followed by a mild illness resembling the tox in type, with colic and diarrhœa but rarely vomiting. Most patients recover in twenty-four hours.

Cl. welchii is an anaerobic, spore-bearing organism, and the incriminated strains produce non-hæmolytic or weakly hæmolytic colonies on blood agar and are specially resistant to heat, withstanding boiling for over an hour. They are only feebly toxigenic and in most characters resemble type A strains. They are not to be confused with the type F strains that in North Germany in 1947-49 caused severe cases of enteritis necroticans in persons who ate tinned meat, rabbit or fish paste (Zeissler and Rassfeld-Sternberg, 1949; Oakley, 1949; Hain, 1949).

Sources and vehicles.—Heat-resistant strains with characters identical to those found in patients and the foodstuffs concerned were isolated from the fæces of some normal persons, guinea-pigs, rats, mice and cattle, and from meat and blowflies trapped in shops and slaughterhouses. All the outbreaks were associated with meats, gravy or stock. Almost invariably the meat had

been boiled, steamed, braised, stewed or, rarely, insufficiently roasted, allowed to cool slowly and eaten next day, cold or reheated.

Six to twenty-two hours after a meal of cold salt beef at a school canteen, about 303 out of 527 children and staff had sudden diarrhœa and colic. The meat, which had been boiled for three hours and stored in the larder overnight, contained very large numbers of heat-resistant *Cl. welchii* with the same bacteriological characters as strains isolated from the fæces of all the victims examined (Hobbs *et al.*, 1953).

FOOD POISONING DUE TO OTHER BACTERIA

In a considerable number of outbreaks none of the usual bacterial causes can be identified and the question arises as to the possibility that certain other bacteria not usually regarded as pathogens may, when ingested in very large numbers, produce symptoms of food poisoning. Among these 'borderline pathogens' are *E. coli* and various paracolon types, aerobic spore-bearers, enterococci, streptococci of the *viridans* (α-hæmolytic) type and perhaps *Proteus*. There is increasing evidence that some of these bacteria may in fact produce substances irritating to the intestinal tract. Outbreaks with an incubation period of eight to eighteen hours have been described, associated with vehicles suitable for bacterial proliferation, such as purees, custards, gravies and meat dishes, in which these bacteria were present in large numbers. Complete proof of the causative role of these organisms may be difficult to obtain.

Moore (1948) described an outbreak in school children who ate chocolate pudding supplied from a central depot under conditions favouring bacterial growth. The pudding contained large numbers of α-hæmolytic streptococci, cultures and culture filtrates of which produced in a human volunteer similar symptoms after a similar incubation period.

The frequent occurrence of food poisoning among holiday-makers in the Thames estuarine towns drew attention to the risks associated with cockles, prawns and shrimps (Logan and Oliver, 1952; Pilsworth, 1952). The cockles are steamed and riddled free from shell, but they and the other shellfish are subsequently liable to contamination during washing and the frequent handling on the costers' barrows. The borderline types of pathogen multiplied enormously in the high summer temperature.

BACTERIOLOGICAL EXAMINATIONS IN CASES OF FOOD POISONING

It is not appropriate to give details here of the technical procedures undertaken in investigation of suspected food poisoning. Samples of vomitus and fæces should be sent quickly to the laboratory in sterile containers. Cultures will be made on suitable selective solid media and in fluid enrichment media designed to favour the growth of pathogens. Identification will be completed by the usual microscopic, cultural, biochemical and serological methods. For some types of salmonellæ, and for staphylococci isolated from the sources mentioned above, strains will be sent to a Reference Laboratory for precise serological identification and definition of bacteriophage type.

Suspected foods should be submitted in sterile containers with a screw cap or tightly fitting stopper. They should be kept cold during transport. The routine laboratory procedure, which has recently been outlined by Hobbs (1954), comprises: direct microscopic examination to give some idea of numbers and types of bacteria, living and dead; measurement of pH; aerobic and anaerobic counts of viable bacteria; direct cultures on selective solid media; enrichment cultures for salmonellæ, pathogenic staphylococci and anaerobic sporing bacilli. Since it is believed that foodstuffs with aerobic and anaerobic colony counts of less than 100,000 per gramme do not give rise to acute food poisoning of the salmonella, staphylococcal or *Cl. welchii* type, the isolation of these organisms from direct cultures is of more significance than the detection of small numbers by enrichment methods.

The bacteriologist can only assess the significance of the bacterial content of a suspected food if he knows about the way in which it was prepared and stored before it was eaten, and the history of the sample before reaching the laboratory, and it is of the first importance that these details should accompany the specimen.

THE BACTERIOLOGY OF BOTULISM

In botulism the victim suffers from the effects of the powerful toxin preformed in the food by the anaerobic spore-bearing bacillus, *Clostridium botulinum*. After a short incubation period, usually less than twenty-four hours, symptoms appear, due to the action of the toxin on the peripheral nerve end-plates. They comprise headache, dizziness, diplopia and other visual disturbances, dysphagia, pharyngeal paralysis and general muscular weakness. Death follows in a high percentage of cases (25 to 70 per cent. in different series).

Of the various types of *Cl. botulinum* those of medical, as opposed to veterinary, interest are types A, B and, rarely, E, which produce different toxins. The organism is highly heat-resistant, most strains withstanding boiling for many hours and the autoclave temperature of 120° C. for 20 minutes. The toxins, for which the lethal dose to man may be as small as 1/100 mg., are inactivated by heating at 80° C. for 5 to 30 minutes, though this may depend upon the strain and the medium in which it is contained.

Cl. botulinum is a common normal inhabitant of many soils and thus gains access to cultivated produce and so to the fæces of farm animals. Since botulism is so rare, it is clear that growth and toxin production by the organism must be determined by a combination of many factors, some of which may be the number of spores present, the time and temperature of heat-sterilization, the nature and acidity of the food and the degree of anaerobiosis maintained.

Botulism is very rare in Great Britain. The only notable outbreak occurred at Loch Maree in Scotland in 1922, when all of the eight persons who ate

sandwiches containing duck paste died of the disease. Many outbreaks have been reported from the United States, and Dack (1949) discusses the foods responsible for 462 of these. Canned beans, corn and other vegetables easily head his list, but such articles as ham, potted game and sausage have more often been responsible in other countries. The higher prevalence in the United States is associated with the greater amount of home canning and pickling, for the high standard of commercial canning has prevented the occurrence of any case from this source for the last thirty years. The food in botulism is often, but not always, rancid or gassy. Botulism is usually diagnosed from its typical clinical picture, but the organism has sometimes been isolated from the fæces or vomit. The organism may be isolated from the food by anaerobic cultural methods combined with heating to destroy non-sporing contaminants. The presence of toxin in the food may be detected, and the type determined, by inoculation of suspensions intraperitoneally into three mice, two of which have been protected by antitoxin of types A and B respectively.

Polyvalent antitoxin, or antitoxin of the appropriate type when it is known, is used in treatment, though its value is doubtful after symptoms are well established. A prophylactic dose of 10 ml. should be given intramuscularly, however, to all who have eaten the toxic food and have not yet developed symptoms. It may be obtained from centres in each of the Hospital Regions of England and Wales, listed in the *Monthly Bulletin of the Ministry of Health* (1953, **12,** 15), and in Scotland from the Bacteriology Department of the University of Edinburgh (Telephone: Edinburgh 41011, Ext. 31).

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DYSENTERY AND FOOD POISONING

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Of the available beds in this fever hospital, over one-third are at the moment occupied by cases of Sonne dysentery. After the first day or two in hospital, 90 per cent. of these patients have no symptoms at all, yet if rigid tests of cure are applied, few will be discharged in less than a month; if only three negative specimens are required, most of the patients will still spend a fortnight in hospital, a fair number will be in for several weeks, and some for a month or two: a few will take their own discharge before bacteriological cure. In the absence of a drug on which we can rely for a specific effect, the treatment and disposal of patients suffering from this disease are among the main problems of modern fever hospital practice. Outside hospital, in schools, nurseries and cottage-homes it can upset normal arrangements for weeks on end; in camps and canteens it can cause sudden disorganization and, in ordinary family life, discomfort and inconvenience to the whole household. The disease is a serious problem of modern public health.

INFECTIVITY

The mechanism of infection is simple; the organism passes, directly or indirectly, from the fæces of an infected person to the mouth of another. Theoretically it should be easy to break the chain of infection—if hands are thoroughly clean they cannot carry the infection: yet, in practice, the spread of infection is often startling. The organism can live on dry linen for as long as thirty days and many objects in the environment of a patient —taps, door-handles, bed-clothes, crockery—may rapidly become infected. In an infected hospital ward, the danger of carrying the infection is present every time a nurse attends to a patient: the dangers of bed-pan attention are obvious, but bed-making, blanket-bathing or serving meals may be more dangerous because they do not so obviously bring the nurse in contact with the source of infection. The infectious patient has no outward signs of infection—no cough, no cold, no rash; if he has passed the first few days of his illness, he probably appears completely well. In my experience, Sonne dysentery is the disease most often caught by fever-hospital nurses.

If infection can spread even when the level of awareness is high, it is not surprising that in other environments the disease proves so difficult to control. In nurseries and nursery schools, outbreaks are often explosive and the whole routine of the toilet and catering regimes may have to be reorganized before spread is checked. The ages and habits of the children

are the greatest problem but the mechanism of infection—hand to mouth —is the same. In kitchens and canteens, infection can occur readily if washing facilities are poor and the staff badly informed. The organism can readily pass through toilet paper; the staff must know this, and how the infection can then be passed on in food.

In families, unless the hygiene is of the highest order, infection inevitably passes from one member to another. If fæcal specimens are taken from all members of a household, it is the rule rather than the exception to find several members infected, although perhaps only one has symptoms severe enough to call for medical attention. In the best families, separate towels may be provided and washing facilities may be adequate, but even then, especially if there are children, it is almost impossible to avoid contaminating lavatory plugs and door handles, and nail brushes and soap may become vehicles of infection. Food hygiene is probably easier to achieve, if the mother is intelligent and cooperative, but it must be applied not only to cooking but to the handling of food at table. It is far from easy to achieve these standards in good families, and in poor families it is probably hopeless to expect any effective cooperation. Sonne dysentery is an environmental disease: it is hardly possible to control it in an unhygienic environment.

SYMPTOMS

It is unnecessary to describe the clinical manifestation of the disease, but two points may be stressed: the character of the stools and the frequent extreme mildness of the illness. Blood and mucus are present in the stools of only a little more than a third of the patients and usually this is small in amount (McLeod, 1955). In young children, the stools are often loose and green and there is nothing to distinguish them from the stools of other types of enteritis; sometimes the stools are semi-formed but otherwise normal. Especially in adults, the disease is often very mild and may consist of nothing more than the passage of one or two loose stools with no other upset whatever. Such a patient may continue to excrete the organism for several weeks and, when questioned, may have forgotten all about the mild intestinal upset. The mother of a family may in this way infect every member of her household, just as a canteen cook or a ward nurse may, after a similar attack, spread infection over a much wider field.

Even in fairly severe cases, diarrhœa usually subsides within a week; in moderate cases, the number of stools per day falls rapidly after the first two days, so that after one week most patients, treated or untreated, have no symptoms. Untreated cases will continue to excrete the organism for a mean period of eighteen to twenty days (McLeod, 1955) and many for much longer. This period can certainly be cut down by treatment, but unless the treatment is applied to the infected group or household, and not to only one or two patients with severe symptoms, it can have almost no effect on the pool of infection.

DRUG THERAPY

From a recent survey of cases treated in this hospital, it is apparent that sulphonamides have very little effect on the period of infectivity; this may not be true with strains isolated in other areas. Chloramphenicol and oral streptomycin both had marked effects, the mean number of days from the

SULPHAGUANIDINE
(*4 ml. of the emulsion = 0.75 gramme*)
7-day course

Age (years)	Dosage	Daily dosage	Total dosage
0-1	4 ml.—4 times daily	3 grammes	21 grammes
1-3	8 ml.—4 times daily	6 grammes	42 grammes
4-10	10 ml.—4 times daily	8 grammes	56 grammes
11-15	5 tablets—4 times daily	10 grammes	70 grammes
Adult	12 tablets—4 times daily for 2 days 6 tablets—4 times daily for 5 days	24 grammes 12 grammes	108 grammes

CHLORAMPHENICOL
(5-day course)

Age	Dosage { Children 75 mg. per kg. / Adults 50 mg. per kg. }	Daily dosage
3 months	4 ml. palmitate 6-hourly	500 mg.
1 year	6 ml. palmitate 6-hourly	750 mg.
2 years	8 ml. palmitate 6-hourly	1 gramme
5 years	10 ml. palmitate 6-hourly	1.25 grammes
12 years	500 mg. (2 capsules) 6-hourly	2 grammes
Adult	750 mg. (3 capsules) 6-hourly	3 grammes

ORAL STREPTOMYCIN
(5-day course)

Age (years)	Dosage	Daily dosage
0-3+	0.25 gramme 6-hourly	1 gramme
4-14+	0.5 gramme 6-hourly	2 grammes
15 upwards	1 gramme 6-hourly	4 grammes

TABLE 1.—Dosage schedules in treatment of Sonne dysentery.

start of treatment to the end of positive swabs being 3.5 for streptomycin and 6 for chloramphenicol, as compared with an average of 14.22 for four sulphonamides (McLeod, 1955). It must be stressed that these figures do not mean that all cases treated with streptomycin become bacteriologically clear in 3.5 days: in fact, two-fifths of the cases continued to excrete the

organism for varying periods after that time, one patient excreting for fifty-four days. Moreover, there is no way of knowing that bacteriological cure has been obtained, except by repeated bacteriological examination. The figures do show a substantial improvement over the results obtained with sulphonamides and, at least for hospital patients, do justify the use of the antibiotics. The dose used in the hospital trial is shown in table 1.

The cost of treating a child of five with the drugs at the prices at the time of the trial was sulphaguanidine 2*s*. 6¾*d*., streptomycin 19*s*. 2*d*., and chloramphenicol 39*s*. 5*d*. Prices have probably fallen considerably since these figures were calculated but the relative costs are obviously important.

TREATMENT IN HOME OR HOSPITAL?

The original purpose of fever hospitals was to isolate the infectious case and so prevent the spread of infection outside. Sonne dysentery shows, as well as any other disease, how ineffective this policy is. In seventy-nine Liverpool families from which a patient with Sonne dysentery had been admitted to hospital, three-fifths of the other children under fourteen years were shown to be infected though remaining at home; in the under-ten group, the proportion was even higher and in the 0 to 2 group the figure was 75 per cent. Isolation of one member in hospital can obviously have almost no effect on the infectivity of the home, especially as most of those at home will normally be unknown excretors.

Not many cases require hospital care on clinical grounds. Very young infants need skilled nursing, although the disease does not often produce the dehydration so characteristic of *E. coli* gastroenteritis. The frail, elderly patient is sometimes severely shaken by an attack of dysentery and requires hospital treatment, but the majority of patients of all ages are not really very ill. Yet large numbers of these patients are admitted because they are infected with dysentery, not because they require hospital care.

The price of drugs has already been quoted but this is a small item in the total cost of treating these patients. Isolation hospitals are expensive to run: they must carry a reserve of empty beds, many of their patients are infants and many are nursed in cubicles so that a high ratio of nurses to patients is required. If the standard of bacteriological cure is set high, the patient may easily be in hospital for five to six weeks. For the purpose of our investigation, twelve negative rectal swabs were required and the cost of treating a patient varied between £80 and £100. Since the end of the trial, three negative swabs have been accepted as sufficient, unless the patient is being discharged to an institution or is employed in food distribution, but even with this moderate standard the average cost of hospital treatment is around £35. In face of this cost and with a disease so prevalent as Sonne dysentery, cases should obviously not be sent to hospital except for good reasons.

When cases occur in residential institutions or children's hospitals it is

always desirable to transfer them to an isolation hospital, provided strict precautions are taken to prevent further spread of infection. When an outbreak gets out of hand, it is a waste of time, effort and money to send case after case to the isolation hospital. The only sound policy is to quarantine the institution, or the infected part of it, and to take steps to eradicate the infection: this may involve bacteriological examination of staff and patients and will certainly require complete overhaul of sanitary and kitchen routines.

As regards cases in general practice, social factors often outweigh clinical factors, and sometimes these are so bad that it is quite impossible to do other than send the patient into hospital. But the other points to be considered are: (a) that the period in hospital may amount to several weeks with, in children, possibly harmful psychological results, (b) that the cost of such hospital treatment is very high, (c) that treatment is very simple and is easily given at home, (d) that most of the other members of the household are probably infected, (e) that, unless discharge standards are high, the patient may still be infectious on discharge and (f) that, in any case, infection may still be present in the family when the patient comes home. If intelligent use is to be made of isolation hospital facilities, all these factors must be considered. If not, then money and time are wasted with no benefit to the patient or the community.

EDUCATION

The only rational way of dealing with the problem is to tackle the cause—faulty hygiene. The difficulty of attempting to correct this in unsatisfactory homes has already been stressed: the facilities are absent, the intelligence and the will are often absent too. The practitioner must do his best with the conditions he finds. In nurseries, kitchens and canteens there is no excuse for accepting low standards: those who work there must understand in detail the mechanics of infection, and those in charge must see that facilities are provided and used.

In writing this article I have made frequent reference to Dr. R. C. McLeod's work carried out in Fazakerley Hospital. I am much indebted to him for the thoroughness of his work and for permission to refer to it.

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ENTERIC FEVER AND FOOD POISONING

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ENTERIC fevers (typhoid and paratyphoid) occur all over the world. Whilst typhoid and paratyphoid are in many respects similar diseases, they exhibit some epidemiological and clinical differences.

EPIDEMIOLOGY

Water-borne and food-borne infection.—Typhoid is more often water-borne than paratyphoid but both may be food-borne. The great fall in the incidence of typhoid since about 1880 in the Western world, particularly in cities, seems to be chiefly associated with the introduction of pure and abundant water supplies. In the more highly developed Western countries the incidence of typhoid is now generally less than that of paratyphoid and it is largely a rural disease, whilst in most Eastern countries this position is reversed. Epidemics of typhoid, being often water-borne, tend to be explosive in character, whereas those of paratyphoid, being predominantly food-borne, tend to be selective. Again, outbreaks of typhoid are often due to infection from a chronic carrier; those of paratyphoid are more commonly associated with a missed case or a temporary carrier. Chronic carriers in paratyphoid, indeed, are little known in Britain, although they may have been observed. Vogelsang (1950) found 1.9 per cent. chronic carriers among 1,027 cases of paratyphoid B in Norway, compared with 3.3 per cent. among 360 cases of typhoid.

After water the next most common vehicle of typhoid infection is milk, but here again the milk may be infected by means of contaminated water during the washing of churns and other utensils. Ice-cream and other foods are occasional sources of a typhoid outbreak, as in the Aberystwyth epidemic of 1946 when ice-cream became directly infected from a vendor who was a chronic carrier. In recent years in Egypt, food served in military messes and grossly contaminated by a chronic carrier has been the source of explosive outbreaks among immunized personnel (Marmion, 1952). Typhoid may also be caused by eating oysters, shellfish or watercress reared in contaminated waters. In Britain this source is now very rare owing to the practice of washing oysters in three baths of chlorinated water and of boiling shellfish. Nevertheless, it is still a problem in Continental Europe. In France alone, 100,000 cases of typhoid with 25,000 deaths were attributed to the consumption of shellfish during the fifteen-year period 1919-33.

The cream cake is now the most common vehicle of paratyphoid infection in Britain. In the South Wales epidemic of 1952, for example, about two-thirds of the 575 cases had some association with baker's confectionery.

Epidemiological evidence showed, however, that the synthetic cream used in the bakehouses was not the primary source of the infection. It was not infected when it arrived there. In this particular epidemic the synthetic cream used would not even support the growth of paratyphoid bacilli, although some creams do so. Synthetic cream seems to become dangerous when it is brought into contact with bread or cakes, thereby moistening them; the mixture is then an excellent culture medium. The evidence in this particular epidemic pointed not to cream but to flour as the substance in which the infection entered the bakehouses. This rather surprising finding was the result of laboratory studies which showed that paratyphoid bacilli could remain viable for nearly a year in flour and that they multiply freely in slightly damp flour sacks. Conclusive proof that the flour was actually infected was not obtained but the suggestion was made that flour can be a means of introducing paratyphoid infection into bakehouses (Thomson, 1953).

IDENTIFICATION OF STRAINS BY TYPING

Bacteriophage (phage) typing strains of *Salm. typhi* which contain the Vi antigen was introduced by Craigie and Yen (1938), and extended to *Salm. paratyphoid B* by Felix and Callow (1951). This method of identifying each strain often makes it possible to trace the spread of infection, localize its source, connect sporadic cases with one another, pin-point single or multiple sources of infection in an outbreak, and indicate particular carriers as the source or absolve others. In the epidemiology of enteric fever the method has become indispensable. Routine epidemiological inquiries may point to a possible source of infection, but without a knowledge of the type of the strains associated with that source and with the outbreak respectively there can be no certainty of any connexion between them.

In one instance all ordinary evidence suggested a known carrier until it was found that he was excreting a different type of bacilli from that of the patients, and further investigations revealed the real source. In the outbreak of 122 typhoid cases at Oswestry Orthopædic Hospital in 1948, a chronic carrier was found who might, on epidemiological grounds, have been the cause of the outbreak but his organism was of a different type from that causing the epidemic. In fact the real cause of this outbreak was never discovered. Sometimes phage typing acts in the opposite way, revealing a common source of infection among scattered cases which, on epidemiological grounds, could be considered separate incidents. This occurred in an outbreak of 11 cases in 1946 which were considered at first to be unrelated as they were scattered over two English counties. Phage typing of the organisms, however, proved that they had a common source and this was traced to a road-side cafe where all the victims had consumed strawberry milk-shake made up with water from a contaminated stream (Ministry of Health, 1946).

CLINICAL CONSIDERATIONS

From the clinical point of view typhoid fever is often visualized too exclusively in terms of the four-weeks' classical course so fully described in textbooks; and paratyphoid fever is viewed as a similar but rather milder and shorter illness. The classical clinical picture is only a generalization. In both infections a considerable proportion of cases suffer only from short mild fevers not clearly marked by the classical diagnostic features of typhoid

or paratyphoid. Such cases are often dismissed at first as 'influenza' or P.U.O., unless or until a more easily diagnosed case associated with them turns up or when a Widal test is found to be positive. Such *formes frustes* occur both in outbreaks and in endemic areas.

In 1950, three cases of classical typhoid fever were diagnosed in a family of 15 persons occupying a house in Finsbury. Widal testing of the whole household revealed that at least 10 of the 15 persons had been infected with *Salm. typhi*. The first illness in this household occurred in an infant who was admitted to hospital as a case of gastroenteritis and who was found to be excreting *Salm. typhi* in the stools only after the above three classical cases had been discovered. Three healthy young adults in the household were then found to have positive agglutination tests, and inquiries showed that they had suffered from a mild febrile illness of a few days' duration within the previous three weeks. Three children in the house were also found to be Widal-positive; they had been ambulatory throughout and only one had mild fever, the other two being symptomless. None of these seven infected cases would have been diagnosed but for their association with the three classical cases, and consequent Widal testing of the household contacts.

Again, in a survey of 346 hospital-treated cases of typhoid in Los Angeles (Bauer and Bower, 1951), 47 (11 per cent.) had an atypical mild febrile course averaging ten days, and the chief symptoms were listlessness, non-productive cough, constipation or diarrhœa, and, rarely, a few tiny rose spots which could easily have been missed. In these cases the white-cell count was usually within normal limits but occasionally was elevated up to 20,000 per c.mm., with mononuclears around 50 to 60 per cent. The absence of the expected leucopenia was often given as a reason for delayed diagnosis.

The clinical features of typhoid fever when untreated by antibiotics are so protean that they can only be summarized here. A characteristic series is that of 360 cases treated in New Orleans Charity Hospital between 1939 and 1944 (Stuart and Pullen, 1946). The age distribution was from infancy to 71 years, and the ten-year age-group with the greatest number of cases was 11 to 20 years. The patients mostly came from farms and rural communities. The incubation period ranged from 3 to 21 days, the mean being 8 to 14 days. The onset was insidious in 90 per cent. and sudden in 10 per cent. Malaise, headache, and anorexia were the prominent prodromal symptoms, and nearly half the patients had respiratory symptoms. Rose spots were present in 45 per cent. of the white patients and were recognizable in 14 per cent. of the coloured patients. The average duration of fever in recovered cases was 31 days. Relapses occurred in 12 per cent. Typhoid meningitis occurred in one case. Conjunctival congestion was observed in only three cases. Five per cent. complained of tinnitus. Epistaxis occurred in 24 per cent. and pneumonia in 11 per cent., with *Salm. typhi* in the sputum in one case. Pleural effusion occurred in two cases. The average pulse rate during the first week was 96 per minute; a dicrotic pulse in the later weeks was detected in 33 per cent., with tachycardia in 8 per cent. The blood pressure showed a gradual and consistent fall during the febrile course. Toxic myocarditis was clinically evident in 1.67 per cent. The percentage with diarrhœa was 43, with constipation at some time in the illness 78, with gross intestinal hæmorrhage 21, and perforation 1.9. Laparotomy for perforation was done eight times with three recoveries. Jaundice was

apparent in 3.6 per cent. and cholecystitis in 2.7 per cent. There were 1.6 per cent. convalescent carriers. There were six pregnant women in the series, all of whom aborted or had premature labour. Blood cultures were positive in 72 per cent., stool cultures in 23 per cent. and urine cultures in 22 per cent. White blood counts usually showed a transient rise from 6000 to 8000 per c.mm. during the first ten days of the disease. Thereafter there was a rapid and progressive leucopenia with relative lymphocytosis till the end of the third week. Secondary anæmia developed rapidly during the first three weeks of the disease and then improved.

The case fatality rate was 12.7 per cent. and rose proportionately with age. The cause of death was toxæmia and exhaustion in 23 per cent., intestinal perforation in 10.8 per cent., gross hæmorrhage with exsanguination in 15 per cent. and in the remainder a combination of causes. Prognosis was chiefly dependent upon age: best below 5 years and worst over 40 years. No specific therapy was used. Bedsores, stomatitis, parotitis and otitis media were found to be preventable by good nursing. Diarrhœa could usually be controlled by suitable diet but an opium and bismuth preparation was occasionally needed. Diet was liquid, administered three-hourly and contained about 3000 calories daily. There is no mention of hæmolytic anæmia as a complication. In recent years this has been found to be an underlying condition in those cases in which jaundice has been accompanied by hæmoglobinuria or increased urobilinogen in the urine (Shaw, 1951; Smith, 1951; McFadzean and Choa, 1953).

THE EFFECT OF CHLORAMPHENICOL

In typhoid fever treated with chloramphenicol, complications are much reduced. Perhaps the greatest triumph of chloramphenicol is its mastery over typhoid fever. With a dosage of about 3 grammes daily for an adult the temperature falls and toxæmia disappears after a lag period of about forty-eight hours, and this happens at almost any stage of the primary fever or of a relapse. The local intestinal ulceration, however, may persist for some days after the temperature has abated, and perforation and hæmorrhage are not now uncommon occurrences during this afebrile period. Neither relapse nor the carrier state is prevented; indeed the former is perhaps more common than before and may occur up to thirty days after defervescence. It would seem that the rapid curative action of the drug interferes for a time with the development of acquired immunity, and so favours, rather than prevents, relapses. This slowing up of acquired immunity is perhaps best countered by giving a series of small doses of T.A.B. vaccine; e.g., 0.1 ml. intramuscularly, three times weekly for two weeks starting either concurrently with the drug or about the date of defervescence. The course of chloramphenicol is preferably restricted to about six days.

THE CARRIER STATE

During convalescence temporary carriage of the organism in fæces or urine is not uncommon for a period of one to two months. When the carrier state

has persisted for three months, however, the chances of spontaneous recovery are small. Any age and both sexes may be chronic carriers, but the condition is relatively rare in childhood and adolescence. The incidence is greatest in elderly women. In a series of 125 carriers, there were 12 over 50 years of age and 11 of these were women; there was one urinary carrier per 31 fæcal carriers; all the fæcal carriers were biliary carriers as well (the organism being found in the duodenal juice). In this respect they were all suitable for cholecystectomy, and 75 to 80 per cent. of those operated upon were cured of the carrier state (Vogelsang, 1950).

From the pathological point of view the chronic carrier state is chronic focal typhoid *disease*. The foci may be situated in the liver, spleen, lymph glands, bone marrow, kidneys and possibly other organs. They are minute endothelial granulomas, consisting of lymphocytes, mononuclear cells, occasionally giant cells, some supporting stroma, and often necrotic centres which are inaccessible to the blood stream and in which typhoid bacilli are able to proliferate. Doubtless, from time to time the bacilli burst out of these foci and invade the blood stream, but when this happens they are nearly always rapidly cleared from the blood by the acquired immunity mechanism, with little or no clinical symptoms. The immune bodies in the blood, however, are unable to penetrate to the centre of the foci; otherwise the carrier state would be quickly and naturally cured. For the same reason few, if any, antibacterial drugs have the necessary high diffusibility to enable them to gain access from the blood stream to the typhoid bacilli snugly esconced in the centre of these foci. I know of no generally accepted evidence that any of the scores of drugs and agents that have been employed in the treatment of typhoid carriers, singly or in combination, has achieved consistent success; and little is known of the permanence of the small percentage of cures reported. At present therefore the effective treatment of typhoid carriers is practically restricted to surgical extirpation of the focus, where that is possible, as in cholecystectomy.

Vi agglutination and carriers.—Felix and his colleagues (1935) were the first to suggest that carriers might be recognized by the persistence of Vi agglutination titres of 1 in 5 or more in their blood serum. The parallelism between persistent Vi agglutination and the carrier state is not, however, complete. Not every carrier has Vi agglutinins, and a person with persistent Vi agglutinins cannot always be proved to be a carrier; partly, perhaps, because of the intermittency of excretion of the organisms, partly because of technical difficulties in isolation of the organism, and partly because typhoid bacilli may be harboured in sites such as bones from which there is no natural excretion. Nevertheless, the Vi agglutination test is of great value in the search for chronic carriers. It is a useful preliminary screen, for example in mass testing of large groups such as workmen in public water-supply undertakings. As a general rule only those with Vi agglutination need have their urine and fæces tested. Again, the Vi agglutination test has become part of the procedure which should be taken before a patient is discharged from

hospital after typhoid fever. Not only should there be three successive negative specimens of fæces and urine, but the Vi agglutination test if positive should be repeated in three months' time, and if it is then still positive at least six further examinations of fæces and urine should be made in an effort to detect the carrier state.

The sewage swab in the detection of carriers.—Moore (1948) devised an ingenious method of tracing carriers by examination of sewage in the vicinity of an outbreak. Folded pads of gauze are lowered through manholes into the sewers and secured so that they trail in the flowing sewage for forty-eight hours. Enteric organisms have thus been regularly isolated from the sewage of communities of up to about 100 persons harbouring a single carrier. In this way also the infection has been followed from polluted river water along the sewers of a residential district to the drains of an individual house in which an unknown typhoid carrier lived.

SUMMARY

(1) Typhoid is mainly a water-borne disease. Its decreased prevalence in Western countries has paralleled the improvement in water supplies. Paratyphoid is mainly food-borne, and the commonest vehicle of infection is cream, especially when in contact with bread or cakes. Dampened flour, if infected, can harbour paratyphoid bacilli for long periods.

(2) Phage typing of *Salm. typhi* and *Salm. paratyphi B* is essential for accurate epidemiology. This method is highly efficient in tracing the spread of infection, in determining the occurrence of single or multiple sources of infection, and in pointing to particular carriers, or absolving others, as the source of outbreaks.

(3) Clinically, both diseases often occur in mild atypical forms which may be discovered only when associated with cases of classical type.

(4) The main clinical features and complications of typhoid are indicated and the highly specific action of chloramphenicol is outlined.

(5) The chronic carrier state is discussed and the role of the Vi agglutination test for typhoid carriers indicated.

(6) Attention is drawn to the value of the sewage swab in the detection of carriers.

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THE PREVENTION OF FOOD POISONING IN THE HOME

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In this article the term, 'food poisoning', is applied to that somewhat ill-defined group of complaints, illnesses of comparatively sudden onset following the ingestion of some infective type of food, where the symptoms have not so far justified definition as a specific disease. The organisms mainly responsible are the staphylococci, in particular the coagulase-positive *Staphylococcus aureus* and the salmonella group, particularly *Salm. typhi-murium* and *Salm. enteritidis*. I include also *Clostridium welchii*.

By 'poisoning in the home' is meant all those incidents which occur, or might so do, as a result of the contamination of foodstuffs other than as part of communal feeding. Thus I shall include instances of food infected outside the home, as, for example, in local shops, but I shall exclude all those cases which form part of an outbreak arising from feeding in restaurants, canteens and schools.

INCIDENCE

The incidence of food poisoning has been rising since the early '40s, so far as records permit of any precise statement. In this increase family outbreaks have taken their part. In England and Wales, only 34 family outbreaks were recorded for the eight years 1941-48. By family outbreak here is meant where two or more cases are confined to the same family. In 1953, there were 422 such family outbreaks in one year. We should add to this in our context some part at least of the 402 outbreaks which affected more than one family, since we are accepting within our terms of reference of food poisoning in the home those instances where there is an infected source in a local shop or dairy; we should add also some, probably a large part, of the 4,363 sporadic incidents recorded during 1953 which must also have taken place within the family. In the records for 1953 the numbers of family outbreaks (422) and non-family outbreaks (492) are about equal. Even if the number of family outbreaks was in fact much higher it is obvious that the proportional incidence in relation to 12,000,000 families is much less than that in relation to, say, one million communal feeding centres.

Of the family outbreaks in 1953 (used here in the sense that the infection was confined to one family and affected more than one member), *Salmonella typhi-murium* affected 260, other salmonellæ 59, staphylococci 31, *Cl. welchii* 3, other organisms 2, chemicals 0, not discovered 67. In the 134 family outbreaks covering the years 1941-48, 126 were due to salmonellæ and 8 to staphylococci. Although it is likely that the majority of staphylococcal in-

fections goes unnoted within the family, the possibility cannot be excluded that infections with the staphylococcus by the housewife, which result in food poisoning, may be rare. The home, which has a pleasantly cushioning effect upon so many of the unwelcome hazards of life, may be running true to form in those associated with the contamination of foodstuffs, at least so far as the source of infection is within the home. For this the main reason could be found in the shorter interval which elapses between the handling of food and its consumption. In particular, food in the home probably seldom stands long enough for the proliferation of the salmonella organisms or the elaboration of the staphylococcal toxins. Although precisely similar principles of hygiene are involved, and probably foods will be contaminated with equal frequency, it may well be that the unwelcome results will be less. It is, for example, unlikely that the housewife who sneezes directly on an article of food, infecting it heavily with *Staphylococcus aureus*, would cause food poisoning in the family if the food is consumed immediately or stored in a refrigerator. Thus, the commonest type of food poisoning, by some estimates three-quarters of the total, which results from toxins of *Staph. aureus*, is probably less likely to occur within the home.

Food poisoning in the home may be caused by the consumption of foods which have been contaminated either (1) outside the home or (2) inside the home. A further subdivision can be made for those foodstuffs contaminated outside the home, according to whether the infection is independent of further action by the housewife, or depends upon the housewife's failure to take precautions or upon her methods of preparation.

Certain foods today carry little risk. Neither bread, despite the unhygienic method of its delivery, nor fish and vegetables, whatever may be true in other countries, are commonly involved in this country. Bacon, kippers and other cured food are usually sterile on delivery.

FOOD ENTERING THE HOME IN AN EXPLOSIVE STATE

This group consists of foods already heavily contaminated. These may be said to be 'immediately explosive'. The foods which may enter the home in this state, where growth of the organism and, in the case of staphylococcus, the production of toxin, have already taken place and so are able immediately to cause food poisoning, can be classified into four groups:—(i) made-up meat dishes, (ii) canned foods, (iii) dairy products, (iv) shellfish. Here we have the combination of foodstuffs which are liable to frequent handling, and/or exposure, together with excellent qualities as a culture medium.

Made-up meat dishes are a common vehicle for salmonella organisms and staphylococcal toxins. Brawns, pasties, pies and sausages are commonly involved. Contamination occurs in the handling during preparation, or by the excreta from rats and mice, which are natural carriers, while standing after preparation. Brawn, for example, may be left to cool on the cellar steps. Generally the chances of infection are greater with foods obtained

from the small, largely unsupervised store than from big packing stations.

Canned foods, more especially those containing meat, may have been contaminated during preparation, although this is now increasingly uncommon, particularly with large producers, whose standards of cleanliness and techniques of preparation are at a high level of scientific perfection. Outbreaks due to toxin in canned foods do occasionally occur but the number is now very small. The process of food inspection by highly trained staffs in the health department also makes it unlikely that 'blown' tins will be sold to the public. In fact, canned foods are much less likely to be a source of food poisoning than will be foods made up at the local shop.

Of the dairy products in an explosive state, the most likely form is ice-cream and here again that which has been made by the local shop or, for example, bought from an itinerant vendor, rather than the standard wrapped product of the large firm. All ice-cream manufacture is subject to regulation and inspection, but for obvious reasons the failure of personal hygiene and/or the relatively small departure from approved techniques of preparation is more likely to escape notice in the small concern. Increase in consumption of ice-cream from the large numbers of small concerns distributing their own made-up article through the streets and the countryside is the chief reason why food poisoning outbreaks are more common in the summer. Made-up cream and cream pastries can be heavily contaminated.

Little need be said about shellfish. The marketing is subject to strict regulation and the chances of contamination have certainly declined during recent years. The mussel and cockle can enter the home, as can more rarely the oyster, already containing salmonella organisms from sewage pollution of their beds. More frequently, and particularly in the Thames Valley towns, heavy bacterial contamination with ordinary organisms has given rise to food poisoning. It is in any case still possible to free shellfish from contamination; and except that this is difficult they would not appear in this section.

FOOD ENTERING THE HOME IN A POTENTIALLY EXPLOSIVE STATE

The second group consists of foods that may enter the home already contaminated and therefore potentially a source of food poisoning, but where the event depends upon the action of the housewife. These may be said to be 'potentially explosive'. The housewife may fail to take reasonable and well-known precautions or may depart from accepted techniques of preparation. This group consists of (i) meat, fish, poultry, and made-up meat products, (ii) milk, (iii) eggs.

Milk can be infected outside the home from the cow's udder, by the milker's hand, or in the dairy. In addition to the many organisms of milk-borne disease, it can convey the salmonellæ and the staphylococci with which we are here concerned. The organism can proliferate in the milk itself or in a variety of made-up dishes; e.g. custards, or milk mashed with potatoes. An outbreak of staphylococcal food poisoning has been traced to

mashed potatoes, containing unpasteurized milk, kept warm for eight hours before serving. As the pasteurization of milk becomes more general this type of infection becomes less frequent. Custard is perhaps the most dangerous. The cook can stop a large country house party with her infected custard as easily as any outside firm of caterers can lay low the wedding guests. Nevertheless, food poisoning from milk can be avoided, since it is the lapse of time spent at room temperature which permits heavy proliferation of the organisms and toxin production. Milk must not be kept in the warm, particularly after the seal has been broken. If it is to be kept over night it should be in a refrigerator. Where this is not possible there are advantages in sterilized milk. Opened tins of evaporated milk should be consumed immediately and not kept for long in the warm.

Meat and made-up meats will not in all cases be infected sufficiently at the time of entry into the home to be immediately dangerous. In such cases, however, proliferation of the organisms may yet take place, given suitable conditions. This may be true, for example, of sausages when left in the warm atmosphere of the kitchen for a day or more. If not cooked immediately, meat, fish and poultry should stand in a cold room or, preferably, in a refrigerator. The contaminated sausage retained in a refrigerator may not become dangerous. Thorough cooking and eating without delay are the best safeguards when refrigeration is impossible. All cooked meat dishes should be consumed within twenty-four hours of preparation. Pies made with raw meat should be cooked to the point of sterility even though the pastry may become a little overbrown. But here it must be remembered that the cooking of meat products, e.g. frying sausage, very rarely sterilizes throughout; cooking does not destroy the toxins already present. Fried sausages, with their centres unsterilized, allowed to cool and stand in the warm, can, once again, become highly charged with salmonellæ or staphylococcal toxins. Opened tins, such as pressed beef, tongue and soups, should be used immediately and not replaced in a cupboard where conditions are usually ideal for the growth of organisms.

Little more than a mention need be given of the whole-meat infections with *Cl. welchii*. In this case food poisoning is almost invariably due to meat which has been boiled, steamed, braised, stewed or insufficiently roasted, allowed to cool slowly and eaten next day cold or re-heated. The spores of *Cl. welchii* survive the first cooking and proliferate in the interval. Refrigeration is the only answer if cold meat is to be eaten without risk.

There are three risks of importing egg infection into the home: (1) duck eggs, (2) hen eggs, and (3) dried egg powder. The risk is sufficiently serious to justify dogmatic instructions to boil hard, i.e. for at least 15 minutes, and to bake, e.g. in a cake, for at least one hour. Light boiling or frying is insufficient to kill the salmonella organisms. The use of the duck egg in egg flips or mayonnaise should never be permitted. The hen's egg is a less serious risk. Contamination usually results from the coating of the external surface with hen manure; quick washing and drying are generally sufficient

safeguard. Scrubbing with a brush can drive the infected material through the shell. When possible, eggs should be kept in a refrigerator. Dried egg powder, particularly the imported brands, introduced a variety of new salmonellæ to this country during the war. Many packets are contaminated but the risk only arises when the powder is reconstituted and allowed to stand in the warm; and particularly when made up into custards, jellies, synthetic cream, and the like, without cooking. When dried egg powder is reconstituted and cooked immediately the salmonellæ are killed.

INFECTION WITHIN THE HOME

The housewife can infect food with salmonellæ or staphylococcal organisms during and after preparation. She will rarely be a carrier, certainly not a chronic carrier, of salmonellæ, but it should not be forgotten that any victim of a communal feeding outbreak may, for a short time at least, be a fresh source of infection within the home. The risk of contamination with staphylococcal organisms from the nose or skin is in no way different from that which operates in the canteen. Any septic area, particularly boils in the nostril or elsewhere, may contain a culture of coagulase-positive staphylococci. The hands may be heavily contaminated from the nose where staphylococci able to cause food poisoning have been shown to persist for months. Food can be infected by dust heavily charged with staphylococci, by handling, and by contamination of utensils and cutting boards. Coughing and sneezing over food can introduce the staphylococcal infection.

If foods infected in preparation remain in the warm, proliferation and toxin formation can take place. Filled sandwiches, for example, particularly when kept moistened in a cloth, and 'hold-over' soups provide exceptionally good incubation material for organisms to grow if kept within the incubation zone—say 50° to 150° F. (10° to 64.5° C.). Prepared sandwiches and soups should never be kept in a warm place for more than four hours. Custards, which are excellent media for the growth of bacteria, can be sterilized by bringing to a second boil after the addition of the thickening mix. The housewife with a refrigerator has the best safeguard and should use it for meat, meat preparations and milk-containing foods rather than permit these to stand in the open. Otherwise foods should be cooked and eaten in quick succession.

Housewives can avoid endangering their families by the observance of relatively few simple rules of personal hygiene. Thorough washing of the hands with hot water and soap after using the toilet is perhaps the most important. A perfunctory rinse is largely useless. The use of a nail brush, so little employed, should become a regular habit to prevent infective material accumulating under the nails. Nails should of course be short. The housewife should have her own towel and not use a common towel which can become grossly contaminated. She should train herself not to touch her mouth, nose, eyes or hair during food preparation, and to avoid sneezing or coughing over food. When she has an upper respiratory infection, a plentiful

supply of clean handkerchiefs helps to prevent gross contamination of the hands and prevents dispersal of organisms when the handkerchief is taken from the pocket. In serving or transferring food an invariable rule should be to use spoons, dippers, ladles, forks or tongs and never to handle unnecessarily the food direct. Drinking glasses and cups should be handled without touching the rim. Hot water should be plentiful, and for washing up, bactericidal, tasteless detergents (e.g. 'roccal', 'cetavlon') should be used. Plates should be allowed to dry on a rack. Smoking in the kitchen, although in itself harmless, should be avoided since this so often leads to slovenly habits of food preparation and usually means that the hand comes in contact with the mouth.

The kitchen should be well lit, floors washed daily and walls frequently. There should preferably be a stainless steel sink and plastic-topped tables which can easily be cleaned and which can be used as a cutting board for bread and the preparation of meat and pastry.

Rats and mice may be carriers of salmonellæ. Dogs and cats may also be infected with *Salm. typhi-murium*. Flies and cockroaches can carry salmonella infection, and flies can transmit dysentery. Happily, in Britain the risk of food poisoning by these means becomes increasingly remote. Foods should never be placed in a situation where they can be contaminated by the excreta from rodents or other animals. Every effort must be made to eliminate pests, but not by the so-called rat virus which, being a salmonella preparation, can result in animal carriers among the survivors. It is also not unknown for direct infection of food with a rat virus to have resulted from the use of domestic crockery for making-up the preparation. All mouse holes should be blocked and food scraps eliminated. Good metal bins with close-fitting lids will keep out rodents. DDT powder and spray can control cockroaches and flies; the latter can also be prevented from entering the food store by a fine wire mesh screen protecting the ventilation system.

THE GENERAL PRACTITIONER AND FOOD POISONING

It must often be the case that the general practitioner has the first information of an infection which subsequently involves many others through the medium of food. By his careful inquiries, by personal collaboration with the health department and by health education in this subject as part of his daily work, he can do much to protect the community. He should know when his patient is playing an important part in food preparation outside the home, whether this is as a domestic worker, for example, in a nursery or hospital or dairy, or in a meat-packing station, school or industrial canteen. Whenever a patient known to be engaged in food handling is seen in the surgery or at home to be suffering from a septic sore on the hand or in the nose or from a gastro-intestinal infection, detailed instructions should be given about the risks to others and the precautions to be taken. A telephone communication to the medical officer of health will give him the opportunity to visit the place of work. The prevention of food-poisoning

outbreaks and the limitation of their spread is a team operation between the general practitioner, the medical officer of health and his staff.

The general practitioner called upon to treat any case of food poisoning, or a patient with any other source of infection, should explain the risks and means of avoiding the spread of infection. The Public Health Laboratory Service is available to all practitioners for investigation of cases of food poisoning. The health visitor can be used to advantage in explaining details of hygiene since she will be able to spend time in explanation and demonstration. A telephone call to the health department or direct contact with the health visitor will be sufficient to ensure this link.

SUMMARY

In short, the chief factors to be borne in mind in the avoidance of food poisoning within the home are:—

(1) Food may arrive in the home in an already 'explosive' state. Against food poisoning by such foods, mainly made-up meats, ice-cream and cream confectionery, there is at this stage no safeguard.

(2) Foods may arrive in the home already infected, but under conditions which allow the housewife to avoid upset to her family by the observance of precautions. The main risks are in made-up meats, milk and eggs. Thorough cooking will kill the organisms but of course not the toxins if already formed. Frying is often inadequate, e.g. sausages, since it does not sterilize the centre. Milk, whether alone or in prepared dishes such as custards, mashed potatoes or trifles, provides an ideal medium in which organisms can proliferate. Eggs are a less common risk and this can usually be avoided by thorough cooking. The chief offender is the duck egg. All foods entering the home in an infected state if retained in the warm either before or after inadequate cooking, can grow organisms profusely. Cooking and eating without delay, and refrigeration, reduce considerably the measure of the risk.

(3) Foods can be infected in the home by the housewife, or other members and by rats and mice and other animals and insects. Scrupulous hygiene will avoid this. The housewife should observe a strict ritual of handwashing and nail scrubbing before handling food, and always after use of the toilet. Ideally, she must not use a common towel, must avoid touching the nose, mouth, eyes or hair during food preparation, should never cough or sneeze over food, never handle foods direct except when this is absolutely necessary, and should refrain from smoking in the kitchen. Rats and mice should be eliminated but not by the rat virus; food should never stand where contamination by these pests is possible; insects and flies should be destroyed by DDT. Made-up meat and milk dishes should be thoroughly cooked and eaten without undue delay. All foods, particularly sausages, soups, meat pies and custards, should be kept when possible in a refrigerator.

(4) The general practitioner can do much by teaching, vigilance in detecting causes of infection and explaining their risk, and by cooperation with the health department to provide a first line of defence.

PREVENTION OF FOOD POISONING IN RESTAURANTS AND CANTEENS

By F. MARJORY OLDERSHAW, M.B., Ch.B., D.P.H.
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The Food and Drugs Amendment Act, 1954, has again focused attention on the importance of hygienic food handling. It is easy to fix standards in regard to the size of rooms, their lighting and ventilation, standard sinks for washing up and the temperature of the water, and the like, but it is not so easy to standardize the individual, and the individual is very much concerned in safe food handling. Prevention of food poisoning is a simple matter: cleanliness is the key-word. Reduced to simple terms, it means clean food handled by clean people in clean premises with clean equipment, and protection of the food from contamination by flies and vermin.

PERSONAL HYGIENE

I put personal hygiene first because the source of contamination in the majority of epidemics of food poisoning has been traced back to the food handler. All candidates applying for work in restaurants or canteens should have a pre-employment medical examination so as to eliminate those who may be potentially dangerous. Anyone suffering from chronic nasal catarrh, infected tonsils, unhealthy gums, discharging ears, or any skin affections, must not be engaged. All those who are engaged should be advised that if they are not feeling well, particularly if they have diarrhœa, a sore throat or a head cold, they must report to the supervisor. A daily check of the staff should be carried out by the supervisor in the food preparation room to ensure that none of the employees has septic cuts or septic spots on the hands or forearms. Anyone suffering from any of these conditions must not be allowed to prepare food.

Facilities for hand washing should be provided in the preparation room (fig. 1), with a good supply of hot water and soap. The hands should be washed thoroughly and the nails scrubbed before starting work in the morning and frequently during the day when necessary. Although the majority of people do wash their hands after visiting the lavatory, it is not always possible to check that this has been done. It is safer therefore to make it a rule that if the employee leaves the preparation room for any purpose at all, the hands must be washed on re-entering the room before starting work again. Paper towels are recommended for hand drying. Nail varnish should be forbidden as it is difficult to tell if the nails are really clean if obscured by a dark varnish; further, varnish might flake off into the food. To prevent hair dropping into the food a white mesh turban is effective; it is cool and comfortable to wear and easily laundered. All the employees

should be provided with white overalls, changed according to need and not at a fixed time. It is important that the food handler should appreciate that, in this instance, the overall is provided to protect the food from contamination by the clothes and not to protect the clothes from becoming soiled by the food. The overall therefore should cover the clothes completely and

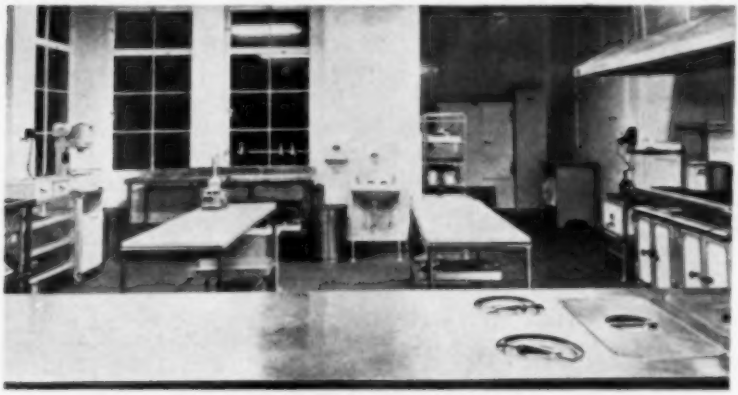

FIG. 1.—A modern canteen kitchen.

short-sleeved overalls should not be issued when long-sleeved dresses and jerseys are worn. It is not advisable to permit the wearing of dress rings and watches as these interfere with the adequate washing of the hands and wrists. Linen handkerchiefs could be a serious source of contamination so these should not be allowed in the food preparation room. A container with paper handkerchiefs can be provided near the wash-hand basin with a lidded bin available for their disposal after use. The hands must always be washed thoroughly after using a handkerchief.

The supervisor in the preparation room should be instructed in regard to these principles of personal hygiene and must check constantly that there is strict adherence to the rules laid down.

EQUIPMENT

All equipment used in the preparation of food must be kept scrupulously clean. Cutting machines (e.g. for ham, meat) and cream mixers should be dismantled at the end of each day, cleaned in very hot water with added detergent, finally rinsed in boiling water, and then covered with buttermuslin until required for use the following day. Smaller items of equipment, such as cutting knives, palette knives, mixers, forks, spoons, tin openers, should be thoroughly washed at the end of the day and sterilized by immersion in boiling water for three minutes. There is no need to provide an expensive type of sterilizer; the gas or electric point with a suitable sized pan is quite adequate. Nor is it necessary to use special bactericidal solutions.

Crockery and cutlery.—All used dishes should be stripped clean before washing so as to keep the washing-up water as clean as possible. Dish-washing machines are quick and efficient, and rinsing can be done at a high temperature. The alternative method is washing and rinsing by hand. This can be done with excellent results, provided precautions are taken to safeguard against certain human failings. The washer-up never seems to change the water sufficiently often, and appears to like washing up in water which has become cold and grey and full of debris. The only way to avoid this is by using double unit constant-flow sinks where the water flows through at a constant fixed rate. The water is delivered into the rinsing sink at 160° to 170° F. (71° to 77° C.), it then flows over into the wash-up sink to which cold water is automatically added to reduce the temperature to 120° F. (49° C.). A measure of detergent is added to the water in the wash-up sink. Rinsing has to be done in wire baskets as, of course, the temperature is too high to put the hands in. Adequate storage capacity for the water must be provided so that there is a constant flow of water at the appropriate temperature.

PREMISES

Food preparation rooms.—These should be well lit, have good ventilation and adequate working space. They should be so constructed that they can be easily cleaned, with impermeable floors and the walls painted with a light-coloured glossy paint. All windows must be fly-screened and doors to adjacent corridors should close automatically. Cooking stoves, storage racks, and the like should either be fitted flush with the wall or moved out at least six to eight inches to avoid inaccessible spaces which cannot be cleaned. The tops of preparation tables should be made of smooth impermeable material with no cracks. A Cleaning Chart should be prepared and fixed to the wall giving exact instructions as to the methods and times of cleaning.

Service areas.—The type of service area will vary according to the 'social level' of the restaurant. If it is of the self-service type (fig. 2), then the foods on display should either be cellophane wrapped, or protected by glass or plastic covers from contamination by dust and flies, or by the customers either handling the food or coughing and sneezing on to the food. Again it is recommended that a definite routine be established for the clearing away of dirty dishes and cutlery, regular cleaning of the tables, and the removal of spillage or discarded packaging from the floors.

In a 'high class' restaurant, close attention should be paid to the personal hygiene of the employees. Waiters' suits, too often in a filthy and insanitary looking condition, should be discarded for ever. Customers should regard it as a public duty to complain about dirty tablecloths, crockery or cutlery.

Yards.—Yards are invariably at the back of the premises, hidden from the public view, and this is probably why they are so often neglected. They are used not only to house garbage bins, but too often as a dump for the accumulated rubbish of the days and weeks and even years. Spilled garbage attracts flies and encourages visits from the cats and rats of the neighbour-

hood. The state of the yard may well be used as a yardstick in measuring the standard of hygiene of the rest of the premises. Good organization and a cleaning schedule will quickly banish the dirt, chaos and confusion. Local arrangements can be made for the frequent removal of the empties. Cardboard, paper wrappings and cardboard cartons can be baled into suitable

FIG. 2.—A cafeteria self-service bar.

sized bundles to facilitate clearance. Bins for dry and wet swill should be cleared daily. They should be housed on metal stands raised sufficiently off the ground so that the area can be hosed down and kept clean and free from spilled debris. The lids of the bins must fit tightly to prevent flies getting in, and to make it impossible for them to be knocked off by rats and cats. Walls round the bin area should be sprayed at fixed regular intervals with an appropriate insecticide solution. A member of the staff should be nominated as the person responsible for seeing that the yard is kept clean and tidy.

FOOD STORAGE

It is advisable to keep food stocks to a minimum and this can be done by intelligent merchandising. Foods which do not require to be refrigerated should be kept in cool, dry, vermin-proofed rooms, the foods being placed on shelves or duckboards to allow free circulation of air and to facilitate cleaning. For the daily preparation of foods, the amount of raw materials required should be drawn from the bulk stock and any left over at the end of the day should be returned to the storage rooms. Food should never be

stored in the food preparation rooms or canteen kitchens, but always in separate food stockrooms where it can be adequately protected.

Perishable foods should be stored in a refrigerator or cold room, and the food must be cold, fresh and in good condition when it is put in the refrigerator. The temperature of the refrigerator (normally set at 32° to 40° F. [0° to 3.5° C.]) must be checked repeatedly. Hot food must never be put into the refrigerator as the air inside becomes humid, the temperature is raised and refrigeration becomes ineffective. When foods are stored in temperatures near freezing point bacterial activity slows down. At 40° F. (3.5° C.) the salmonella group of organisms, staphylococci and the spore anaerobic organism, *Cl. botulinum*, do not grow at all.

Low-temperature refrigerators (i.e. 'deep freeze'—minus 5° F. [-20° C.]) should be used only for foods which are to be kept frozen. This temperature immediately kills off many of the organisms present, and prolonged storage —one to five months—kills off the salmonella organisms and staphylococci. The spores of *Cl. botulinum* are not killed by freezing, and staphylococcal toxins can resist this temperature for at least two months. If organisms are present which have not been killed by freezing, growth starts again when the food is thawed.

FLY AND VERMIN CONTROL

The insects found in restaurants are house flies, bluebottles and greenbottles, steam flies, cockroaches and silverfish. Recent research has shown that in this country there is not a great danger of flies causing serious contamination of food but, nevertheless, it is possible in certain circumstances. In countries where the incidence of typhoid and paratyphoid is high and sanitary conditions are poor, the fly can be a dangerous carrier of disease. In this country, also, in rural areas where sanitary conditions are unsatisfactory, the fly could pick up infective material and transfer it to food; but in our towns, with the water-carriage of sewage and the adequate protection and disposal of garbage, there is no great danger of the fly picking up infective material. The greatest danger probably comes from people spitting in the street and the fly transferring staphylococci and streptococci to food in this way. When foods, raw or otherwise, are delivered, they can be protected during transit either by packing in cartons, using lidded containers, or by covering with buttermuslin. On delivery the food should be taken immediately to the food stock room, the kitchen, or the refrigerator, depending upon its type and purpose. The windows of all food preparation rooms should be fitted with fly-screens made of fine wire gauze, the screens being so designed as to allow opening of the windows for ventilation. Foods on display should be wrapped in cellophane or protected with plastic covers or glass screens.

Steps should be taken to destroy the fly at all stages of its existence. The lids of refuse bins must fit closely and care must be taken to prevent spillage of the garbage around the bins. Walls and the ground adjacent to the bins

should be treated regularly with DDT preparations or 'gammexane', and also those particular places inside the premises where the flies tend to settle: e.g., electric light fixtures, ventilating cowls over the cooking stoves, hot-water boilers. Cockroaches and steam flies hide in crevices in walls and floors during the day and appear at night. These also may transfer bacteria from place to place. If the infestation is severe, hollow places will have to be ripped open to get at their breeding sites. Repeated treatment of the floor and crevices with DDT or 'gammexane' is effective.

Rats and mice can be infected by one of the types of salmonella which infect man. Their infected excreta contaminate food, and outbreaks of food poisoning have occurred in this way. Responsibility rests upon the employer to keep his premises free from vermin. If the premises have become infested and serious damage is being done to food he must report this to the local authority.

To keep premises free from vermin several factors must be considered:—

(1) Vermin-proofing of the outside of the premises.

(2) The protection of stored food inside the premises.

(3) The discouraging of entry by ensuring that no food is available for them.

(4) Regular routine inspection of the premises for traces; if traces are found, poisonous baits should be laid down.

(5) Block disinfestation by the local authority if adjoining premises have become infested.

Vermin are mainly nocturnal in their habits. They gain entry to buildings through unprotected drains, broken air gratings in walls and badly fitting external doors. All drain openings should be protected with wire mesh netting. Holes in walls must be repaired, external doors must fit closely and all edges should be reinforced with metal strips.

Scraps of food must never be left around overnight and floors must be clean of any spillage of foods or crumbs in food preparation rooms, service and storage areas. Particular attention must be paid to spillage in yards and at refuse bin points.

In spite of these precautions vermin may gain entry to the building in cartons of food, so there should be regular inspections of the premises for traces. If traces are found the vermin-proofing should be examined and checks made on the food storage, garbage disposal, and the like. Bait and traps should be laid down. The best type of bait is probably dicoumarol which causes death by spontaneous hæmorrhage and has the further advantage that no pre-baiting appears to be necessary. In addition, it is not poisonous to other animals and humans. Fresh bait should be laid down daily over a period of about ten days. If all these measures have been taken and still the premises become infested, then probably the vermin are coming in from adjoining premises through hollow floors, or pipe ducts, or vents. The local authority should be advised and block disinfestation carried out.

Emphasis must again be laid on routine inspection and supervision,

either by a nominated person on the staff, or by entering into a fixed agreement with the local authority or a private rodent control service.

EDUCATION AND SUPERVISION

Premises, equipment, food storage facilities, and the like may all start off by being up to the required standard as agreed by the accepted authorities, but none of these will remain satisfactory or operate smoothly without constant education and supervision of the personnel concerned. The employee engaged in the actual preparation of the food must understand why it is important that the hands should be washed after using the lavatory, why flies and vermin may be dangerous, and so on. The supervisor in the preparation room should know why it is so important that she should see that all the rules laid down are in fact obeyed. The proprietor of the restaurant or the canteen must appreciate his responsibility to the public and to his staff that the food supplied is clean and safe to eat. Everyone therefore must be told how food can be contaminated and how illness can arise as the result of this. They must be given the knowledge to appreciate for themselves that clean food served in clean premises by clean people is not only desirable but absolutely essential if illness is to be prevented.

There are different ways in which this education can be provided. In large firms a permanent member of the staff may give the lectures: the medical officer, the nurse or a member of the training department. The staff of small restaurants or canteens could attend the courses arranged by the various local authorities, or apply to the Central Council for Health Education for a lecturer. The best method is probably the film strip and lecture, or the sound film. Personally I prefer the film strip, as the lecturer can stop to emphasize or enlarge on a particular point and stimulate interest and discussion. The lecture should be repeated frequently to cover the newcomers to the group and to act as a refresher to the older members. In addition, attractive posters can be used to focus attention on salient points such as the washing of hands, clean overalls, reporting of sickness. Special leaflets, perhaps slogans amusingly illustrated, can be distributed from time to time. In fact the educational campaign must go on all the time, trying to introduce variations in the theme to avoid the staleness of repetition.

In regard to supervision, there must be a fixed daily routine and each supervisor must be made personally responsible to the management for ensuring that rules are obeyed. In turn, someone on management level with full knowledge and understanding of the underlying principles of safe food handling should, from time to time, do a surprise inspection of kitchens, preparation rooms, food storage rooms, service points, yards and garbage bin clearance areas. Experience proves that employees do not resent this education and supervision. On the contrary, it makes them feel that they are doing a vitally important job in which everyone is interested, and they become proud of the high standard achieved and zealous in maintaining their good reputation.

PENICILLIN-RESISTANT PNEUMONIA

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THE majority of patients with pneumonia respond to the sulphonamides or penicillin by uncomplicated recovery; many of the remainder are effectively controlled by the broad-spectrum tetracyclines. Unfortunately, since the penicillin era there has been a growing recognition of virus pneumonia. It is unfortunate, in as much as virus pneumonia and pneumonias resistant to penicillin have become associated to such a degree that they are often considered to be synonymous. In a recent survey of virus diseases in general practice (Watson, 1954) it was considered tempting to define virus pneumonia as a penicillin-resistant pneumonia. This view may be strengthened when a good response follows the use of the broad-spectrum antibiotics, for virus pneumonia often responds to this therapy.

Diagnostic deductions following treatment are often used successfully in practice, but this may lead to an erroneously high incidence of sporadic virus pneumonia, out of proportion to its true incidence. Furthermore, and this may have graver results, the clinical diagnosis of virus pneumonia may allay suspicion of a more significant underlying lesion such as carcinoma of the bronchus.

It is therefore still important to be as accurate as possible in the etiology of penicillin-resistant pneumonia. Since the practitioner is the first to recognize it, it is hoped that further information will be sought by the respiratory tract diseases study group of the College of General Practitioners.

DIFFERENTIAL DIAGNOSIS

Penicillin-resistant pneumonia may be associated with:—

(1) Aspiration of infected material from upper respiratory infections.
(2) Penicillin-resistant organisms.
(3) Penicillin-insensitive organisms.
(4) Bronchial block, especially carcinoma of the bronchus.
(5) Adjacent suppuration.

Aspiration broncho-pneumonia.—The development of bronchopulmonary segmental pneumonia may follow the aspiration of infected material from an upper respiratory tract infection (Ramsay and Scadding, 1939). The severity of these pneumonias depends largely upon the virulence of the organisms aspirated and the efficiency of the local mechanical defences of the respiratory tract. The response to penicillin may be poor, because it is unreasonable to expect a bactericidal agent to possess the expectorant qualities needed to unblock the affected segment. Much more specific in such circumstances is the response to postural drainage, which may result in re-aeration of the involved area within twenty-four hours. Aspiration pneumonias of the type not responding to penicillin are soon labelled

'primary atypical pneumonia' and from there it is but a small jump to the term 'virus' pneumonia. This error can be magnified to epidemic proportions when an increased incidence of pneumonia follows an epidemic of upper respiratory tract infections. In an effort to correct this over-liberal usage of the term, primary atypical pneumonia, Robertson and Morle (1951) went so far as to suggest that primary atypical pneumonia was synonymous with aspiration pneumonia. This sweeping generalization was not universally accepted, and virus and aspiration pneumonias can usually be differentiated (James, 1953) (table 1). The clinical differentiation depends largely upon the history of onset and the degree of response to the various antibiotics and to postural drainage.

	Virus pneumonia	*Aspiration pneumonia*
Onset	Constitutional	Upper respiratory tract infection
X-ray finding	Not necessarily segmental	Segmental lesion
Complement fixation test	Psittacosis + Q fever + Influenza +	None
Cold hæmagglutinins	+	—
Streptococcus MG agglutinins	+	—
Response to sulphonamides and penicillin	Poor	Moderate to good
Response to newer antibiotics	Good	Variable
Response to postural drainage	None	Good

TABLE 1.—Differential diagnosis of virus pneumonia and aspiration pneumonia.

Virus pneumonia begins as a constitutional upset with headaches, malaise and aching pains, suggesting a stage of viræmia. These early symptoms overshadow the mild, inconspicuous respiratory effects. On the other hand, aspiration pneumonia is heralded by an upper respiratory tract infection which tends to 'slip down to the chest'. The physical signs in both conditions may be identical, so the therapeutic response may be important in the clinical differentiation. True virus pneumonia does not respond to penicillin but there is dramatic improvement following the use of the broad-spectrum antibiotics. Within a few hours, there is a lessening in intensity of the constitutional symptoms, and within twenty-four hours there is a lessening of the fever, which is usually normal in forty-eight hours.

Penicillin-resistant organisms.—Penicillin has been used for a sufficient time to enable many organisms to become resistant to it. Failure of subsequent response to the tetracyclines should not be interpreted clinically as virus pneumonia. The increasing resistance of staphylococci to penicillin is leading to a stalemate in the treatment of staphylococcal pneumonia.

Penicillin-insensitive organisms.—Organisms which are insensitive to the action of penicillin include fungi, bacteria, viruses and rickettsia. Pneumonia due to Friedländer's bacillus (*Klebsiella pneumoniæ*) is fortunately rare, for it is associated with a high mortality. It responds to the broad-spectrum tetracyclines and to streptomycin. Tuberculosis may present as an acute pneumonia, resistant to penicillin but, like Friedländer's pneumonia, show-

ing a clinical response to streptomycin. Whenever this sequence of events is encountered, sputum examinations should be undertaken for the gram-negative bacilli of *Klebsiella pneumoniæ* and for acid-fast tubercle bacilli.

True virus pneumonia may be due to viruses of the psittacosis-lymphogranuloma group and to *Rickettsia burneti*, which causes Q fever. When the influenza viruses are responsible, there is usually an associated bacterial infection. There remains a group of pneumonias, presumably due to an unidentified pneumotropic virus, which is associated with raised cold hæmagglutinins. This latter group, psittacosis and Q fever are the virus pneumonias which respond adequately to treatment with the tetracycline antibiotics. The diagnosis may be confirmed retrospectively by the development of serological antibodies.

Bronchial block.—When penicillin-resistant pneumonia is regarded as synonymous with virus pneumonia, it is dangerously apt to encompass pneumonia associated with a neoplasm or other lesions causing bronchial block. This in itself provides sufficient grounds for insisting upon an x-ray of the chest in every case of 'primary atypical pneumonia', especially if such a case does not respond promptly to the newer antibiotics.

Adjacent suppuration.—Persistence of a pneumonia and its seeming lack of response to penicillin may also pose the question of whether there is a localized pleural effusion or empyema, pulmonary suppuration or subphrenic abscess which will persist until adequate drainage is used in conjunction with penicillin or another antibiotic. Physical signs may be suggestive of such a collection of pus and appropriate skiagrams should be undertaken.

MANAGEMENT

The management of clinical pneumonia in practice remains a challenge to those who do not wish to obscure the condition by a blunderbuss of antibiotics and meaningless terms such as 'primary atypical pneumonia'. The following principles of management are suggested:—

(a) Sulphonamides (or penicillin) should be administered initially, together with early postural drainage of the affected area. The value of postural drainage should be explained to the patient, because his intelligent cooperation is essential.

(b) If there is no response to sulphonamide compounds, penicillin should be substituted, and postural drainage continued.

(c) If there is no response after three days, one of the newer antibiotics such as tetracycline is indicated. Because of possible antagonistic action it should be given instead of, and not together with, penicillin.

(d) Lack of response should be an indication for x-raying the chest.

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DENTISTRY AND THE MEDICAL PRACTITIONER

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This article has resulted from conversations with several friends who are medical practitioners. They have been visited from time to time by patients whose trouble turns out to be of dental origin, and have realized that they should know a little more about dental diagnosis, and the treatment of dental conditions which require immediate attention.

The medical student is told all about such conditions as Hutchinson's teeth and stomatitis due to heavy metal poisoning, which are in fact rarely seen and are mainly of academic interest. On the other hand, he is taught little or nothing about such relatively common conditions as carious teeth and gingivitis due to poor oral hygiene. The dental cases which practitioners seem to see most often are those in which the patient complains of pain, a swollen face, bleeding sockets, bleeding gums, or of ulcers in the mouth. Occasionally a patient complains of foul breath, discoloured teeth or of difficulty in opening the mouth. A surprising number of mothers seek dental advice from their doctors for themselves as well as their children.

INSTRUMENTS

Hamilton Bailey (1954) has shown what a wealth of information can be obtained by examining the mouth with relatively simple apparatus, such as an electric torch and a wooden spatula. A dental mirror, a sharp and a blunt probe might well be added to these (fig. 1). The mirror can be used for retracting the cheeks and reflecting light (a laryngeal mirror makes a good substitute). When inverted, and the handle used for percussing suspected teeth, the full value of this inexpensive instrument will be appreciated. The sharp probe will serve among other things to save the embarrassment of asking the dental surgeon to fill a 'cavity' which happens to be a discoloured filling. A probe pushed into caries feels as though it were in a piece of wood. The surfaces of sound enamel, dentine and permanent fillings cannot be penetrated and, when probed, feel as hard as china. The blunt probe is useful for assessing the depth of gum pockets.

Armed with these simple instruments the medical practitioner is in a position to arrive at a dental diagnosis.

PAIN

If the patient points with certainty to one particular tooth one can be fairly sure that this is the source of pain. Often, however, it cannot be localized so accurately and the patient points vaguely to the upper or lower facial region, or, more disconcertingly, spreads his hand over the whole of one side of his

face. This is where a short history is of value before the mouth is examined. Pain associated with hot, cold or sweet foods, often signifies exposed dentine, either in a cavity or around the necks of the teeth. Test for cavities in the teeth with the sharp probe and look for areas where the gingivæ have receded from the necks of the teeth. Run the probe gently over them to see

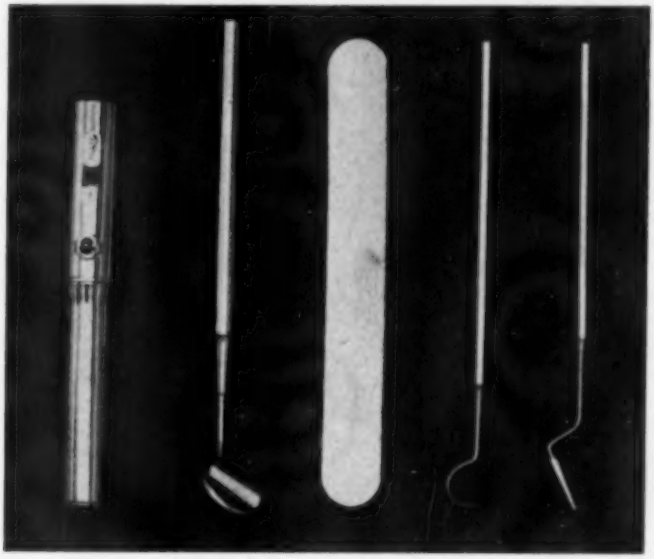

FIG. 1.—Suggested dental instruments for use in a doctor's surgery.

if they are sensitive. If the patient complains of a dull ache or a throbbing pain, a careful search should be made for cavities in the teeth and redness and swelling in the buccal sulcus, or on the palatal or lingual aspects of the alveolus where an alveolar abscess may be pointing. If this does not yield a diagnosis, the teeth should be percussed individually to see if they are painful or loose. In some cases the pain is accentuated and localized more readily after the patient has rinsed the mouth out with hot or cold water.

It should be remembered that the pain from acute sinusitis can resemble pain of dental origin. A diagnostic point in such a case is sensitivity to percussion of *several* upper teeth without any obvious dental cause. Sometimes the patient complains of a throbbing pain when the head is bent forwards. These points may save the patient an unnecessary visit to the dental surgeon.

SWOLLEN FACES

An alveolar abscess, like any other acute abscess, tends to point along the

line of least resistance, which is of course governed by the local anatomy. If this should occur above the attachment of the buccinator to the upper jaw, or below the attachment of this muscle to the lower jaw, the inflammatory process spreads into the tissues of the cheek and causes a swollen face. Should the reverse occur a 'gumboil' will be seen in the mouth (fig. 2). The patient usually states that he had severe throbbing toothache the day before, which got somewhat better when his face started to swell. Examination will usually reveal a grossly carious tooth which is very painful when percussed. The severity of such a condition can be assessed by the patient's temperature and constitutional symptoms, which are not usually appreciably marked in an adult. Should these be severe, however, and inflammation tend to spread towards the inner canthus of the eye or into the neck, a course of some suitable antibiotic should be started at once before sending for the dental surgeon.

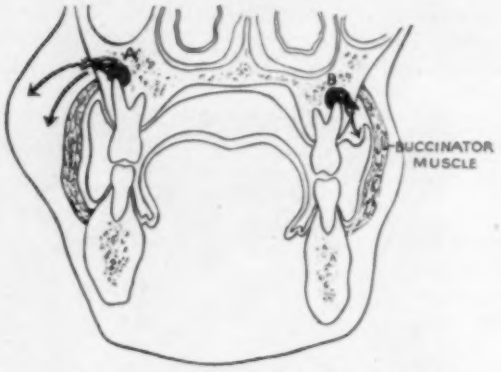

FIG. 2.—Coronal section through the mouth in the plane of the second molar teeth. A. Abscess pointing into cheek above buccinator attachment. B. Abscess pointing below buccinator attachment and forming gumboil in buccal sulcus.

HÆMORRHAGE FOLLOWING EXTRACTIONS

Although this may be due to traumatic extractions, it is often due to a combination of reactionary hæmorrhage and patient's folly. So many patients disregard advice to 'take it easy' for the rest of the day, and take exercise or alcohol instead. With the consequent increase in blood pressure the socket starts oozing. They then resort to warm mouthwashes which prevent a clot from forming in the socket, and finally arrive at their doctor's evening surgery requiring attention.

The first thing to do is to locate the area where the hæmorrhage is occurring. If a large blood clot obstructs your vision, remove it with a piece of gauze. Then, while swabbing the socket with some dry cotton-wool, try to identify the exact bleeding points. These are often seen in the gum surrounding the socket, but are occasionally found in the depths of the socket. It is then possible to assess whether the bleeding is arterial, venous, or capillary in nature, and whether there is an abnormality in the clotting

mechanism of the blood or in the reaction of the vessels. It need hardly be mentioned that if clots can be seen in other sockets the fault does not lie in the clotting mechanism of the blood.

Pressure is still the cheapest and best method of arresting hæmorrhage, and position and rest still play their parts in this. A rolled-up swab is placed directly over the socket and the patient is told to bite hard upon it for fifteen minutes. If this is not effective the swab should be dipped in 1:1000 solution of adrenaline hydrochloride and applied with similar pressure. This vasoconstrictor is very effective in cases of capillary hæmorrhage. Astringents such as tannic acid and alum can be placed on the swab. They act by precipitation of proteins in the tissues and vessels. The various preparations of absorbable hæmostatic gauze are very effective when introduced into a socket, but the practice of plugging a socket with unabsorbable gauze should be avoided because it delays healing and often leads to subsequent infection. A blood clot is the most desirable thing to have in a socket.

BLEEDING GUMS

The vast majority of cases of bleeding gums have a simple etiology, such as poor oral hygiene, or calculus around the teeth. If the patient says that the bleeding has been going on for some days or weeks when he brushes his teeth, the cardinal signs of inflammation should be looked for, particularly redness and swelling. The case is probably one of early or acute gingivitis. If the patient states that the bleeding has been occurring for months and the signs of inflammation are not apparent, a calculus should be looked for and, using the blunt probe, pocketing around the necks of the teeth. The case is probably one of chronic parodontal disease (pyorrhœa), a condition which for these purposes can be regarded as the later stages of an untreated gingivitis.

If the patient complains of bleeding gums accompanied by severe pain and general malaise, Vincent's infection is the likely diagnosis. Early cases will show all the signs of acute inflammation. The papillæ of gum between the teeth soon become replaced by saucerized, necrotic, yellowish ulcers which bleed upon the slightest provocation. These ulcers subsequently coalesce to form the classical 'ribbon ulcer' around the necks of the teeth. By this time, however, the smell is diagnostic and the mouth need hardly be examined. Vincent's acute ulcerative gingivitis will respond rapidly to penicillin lozenges or chewing gum which should be given for two or three days. Nevertheless, gum tissue has been destroyed and will never be replaced. It is therefore important that after the acute phase has passed the patient should receive dental treatment and instruction in oral hygiene in order to prevent a recurrence.

Hyperplastic gingivitis due to pregnancy is not uncommonly seen in a busy practice. It can usually be controlled by careful attention to oral

hygiene, combined with the use of astringent mouthwashes. The condition usually improves considerably after parturition. Hyperplastic gingivitis due to such conditions as mouth breathing, 'epanutin' therapy, leukæmia, scurvy, polycythæmia vera, and Cooley's anæmia are comparatively rare and will not be described here. Be wary, however, should a patient complain of spontaneous hæmorrhage from the gums accompanied by constitutional signs and symptoms; you may well be dealing with the oral manifestation of a blood dyscrasia.

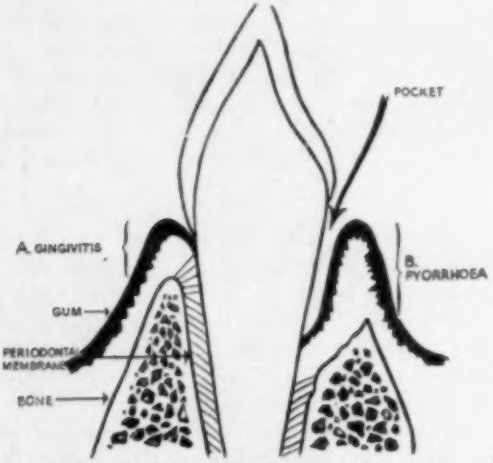

FIG. 3.—Longitudinal section through incisor tooth and surrounding tissues. A. Gingivitis. Inflammation of gum. Periodontal membrane not affected. B. Parodontal disease. Inflammation affecting periodontal membrane and bone, leading to pocketing.

Practitioners often ask 'what exactly is pyorrhœa and can it be cured?' When the gingivæ are inflamed (which may be due to a variety of causes) and the periodontal membrane is not involved, the condition is known as gingivitis. If this continues as a chronic condition the inflammatory process eventually leads to destruction of the superficial fibres of the periodontal membrane and the surrounding bone. Pockets are thus formed between the tooth and gum. This condition is called parodontal disease or 'pyorrhœa'. It may vary in severity, depending upon how much of the periodontal membrane has been destroyed and to what extent the attachment of the tooth to the alveolar bone has thus suffered (fig. 3). Generally speaking, if the teeth are still firm the condition can be prevented from getting worse.

ULCERS IN THE MOUTH

The majority of oral ulcers are caused by trauma from hard objects in food or faulty toothbrushing, or from the rubbing of a denture. The first men-

tioned result in shallow ulcers, the size and shape of which depend upon the cause of the trauma. They have a clean red surface which soon becomes covered with a greyish-yellow adherent slough. These ulcers heal rapidly. The chronic traumatic ulcer heals only when the denture has been trimmed or left out—a valuable diagnostic point. It looks at first like the acute traumatic ulcer, but continual irritation from the denture results in the formation of granulation tissue around its margin and thus, after many months or years, an indurated fissure may be seen with surrounding granulation or fibrous tissue. It is always of value to check the relationship of an ulcer to the margins of a denture or to the biting surfaces of the teeth.

Herpes simplex occurs in the mouth as extraordinarily painful, shallow, well-defined, round or oval ulcers, usually not more than 3 mm. in diameter. They are covered with an adherent yellow slough and have a surrounding areola of inflammation. These ulcers, which are usually multiple and tend to recur, are commonly found on the mucosa of the lips, tongue and cheeks. They are rarely seen on the mucosa of the gingivæ and hard palate which is tightly bound down to underlying bone. 'Aureomycin' ointment (2 per cent.) will relieve the pain in twenty-four hours when applied to these ulcers, but will not prevent their recurrence. Aphthous ulcers have a similar history and appearance. They have, however, a less regular margin and often exceed 3 mm. in diameter. Despite the similarity to herpes simplex it has not been established that these ulcers are caused by a virus infection. The pain can be relieved by touching them with silver nitrate or some other suitable caustic agent.

It is not proposed to deal here with snail track ulcers, gummas and oral tuberculosis because these are treated fully in classical textbooks and are rarely seen in general practice. It should, however, be noted that whenever an ulcer has been present in the mouth for more than fourteen days, has no obvious cause and does not respond to treatment, a blood count should be taken and if this is normal a biopsy should be performed.

FOUL BREATH

Halitosis may be caused by oral or extra-oral conditions. To distinguish between these two groups, the patient should be asked to breathe out through the nose while keeping the mouth closed. If the breath still smells unpleasant it is not due to any oral condition. The dental causes of halitosis are usually obvious. The most common is poor oral hygiene which allows food debris to collect on the teeth and decompose. Other causes are gross parodontal disease, Vincent's infection and dirty dentures. It is worth remembering that retention crypts of the tonsils can also be a source of halitosis.

Extra-oral halitosis is commonly due to the elimination of substances from the blood stream *via* the lungs. This may be the result of metabolic disturbances and a variety of systemic diseases, as well as alcohol, onions and garlic. The contents of the stomach do not cause halitosis directly, unless

belching or vomiting occurs. Infections of the respiratory tract such as maxillary sinusitis, lung abscess and bronchiectasis are other causes.

DISCOLORATION OF THE TEETH

This is commonly seen in patients with poor oral hygiene and among those who smoke. A green stain is quite often seen near the gum margins of children's teeth. This often worries the parents. It is said to be due to a film of chromogenic bacteria on the surface of the teeth and can easily be polished away. The thin black line often seen on children's teeth can be similarly removed. It should be remembered that tonics containing iron will cause staining of the teeth unless they are taken through a straw. The rarer causes of discoloration of the teeth are beyond the scope of this article.

DIFFICULTY IN OPENING THE MOUTH

Trismus of dental origin is almost always the result of inflammation around the insertions of the muscles of mastication into the mandible. Since the medial pterygoid, masseter and temporalis muscles all have part of their insertions in the neighbourhood of the lower third molar (wisdom tooth), inflammation around this tooth is a common cause of trismus. As it erupts the lower third molar pushes up a flap of gum distally. Should the eruption of this tooth become impaired by impaction, a stagnation area remains beneath this flap of gum and readily becomes infected (fig. 4). If it is possible to see the inflamed tissues the diagnosis is in little doubt. The submandibular and upper deep cervical lymph nodes are usually enlarged and tender. Here again the constitutional symptoms should be assessed, because the spread of infection from this region can have serious consequences. If the infection spreads into the cheek it is relatively harmless, whereas if it should spread to the submandibular and sublingual spaces (when the floor of the mouth will be felt to be turgid and is painful on palpation) a Ludwig's angina may result. The infection might also pass *via* the tissue planes to cause a cellulitis of the neck and œdema of the glottis.

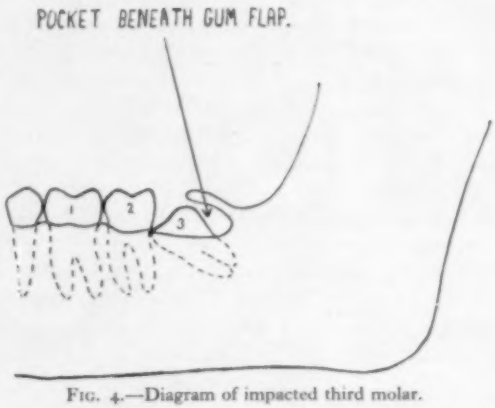

FIG. 4.—Diagram of impacted third molar.

The treatment of an erupting lower third molar seldom consists in immediate extraction of this tooth. The upper third molar is often found to

be biting upon the gum flap and is sometimes removed as a preliminary measure. The whole question of treatment of erupting third molars calls for considerable judgment on the part of the dental surgeon.

DENTAL FOCI OF INFECTION

Carious cavities are not a likely focus of infection in systemic disease, unless they are very large and numerous. When this is the case they may lead to the inhalation or ingestion of infective material. Parodontal disease and calculus, however, have often been greatly incriminated as possible foci of infection, not only by direct spread, but also by hæmatogenous routes (Okell and Elliott, 1935; Fish and Maclean, 1936). Dead and root-filled teeth are not necessarily infected, but there is often no sure means of telling this. If all possible foci are to be eliminated the fate of such teeth will depend upon the judgment of the dental surgeon.

It need hardly be mentioned that healthy teeth which have no surrounding pathology are never removed as suspected foci of infection. Indeed, their removal would result in interference with the physiology of feeding and thereby make the patient's general condition worse than ever.

ADVICE TO MOTHERS

Expectant mothers.—Expectant mothers often ask how they can ensure that their baby's teeth will be well formed. This is a time when the mother can be greatly influenced and the opportunity should not be lost. It should be explained that the milk teeth begin to calcify about the fifth month of pregnancy and the diet will influence them just as it will influence the general development of the fœtus. A well-balanced diet as advocated by antenatal clinics, consisting of natural foods whenever possible, is quite adequate to ensure proper calcification of the teeth and no extra calcium intake is necessary. Two pints (1.2 litres) of milk a day are quite adequate for these needs. This is the time when the mother should have her own teeth examined and when she is most likely to accept dental treatment. Although research has shown that there is no increase in the incidence of caries during pregnancy, the mother does not want to be troubled with toothache when she is lying-in. Dental treatment is best carried out during the middle three months of pregnancy.

Children's teeth.—It is just as important that the infant should receive the correct diet. Calcification of the permanent teeth begins at birth and continues until 6 to 7 years of age. After this time there is no method of influencing their formation. Breast feeding is recommended because it ensures that the child receives the correct food in the correct proportions. After weaning, the diet should include 1½ pints (1 litre) of whole milk and adequate amounts of fruit, vegetables, wholemeal bread, ascorbic acid and cod-liver oil every day.

The habit of brushing the teeth should be encouraged early. Most children can be taught to brush their own teeth by the age of 4 years.

Children's visits to the dentist.—These should be started quite early so that the child becomes accustomed to having his mouth examined before treatment is necessary. If caries develops it is easily and painlessly removed at an early stage and the child thus gains confidence in his dentist instead of being terrified of him. Incidentally, it should be remembered that reluctance to eat is sometimes due to pain during chewing which the child is afraid of mentioning. One often hears of parents wanting to have carious milk teeth extracted 'because they are only temporary anyway and not worth filling'. This policy is unwise except in cases of gross caries because the deciduous teeth maintain the space to be later occupied by the permanent successors. If the former are lost at an early age irregularity of the permanent teeth may follow.

Irregularities of the teeth.—The general practitioner occasionally sees a child with obvious irregularity of the teeth. Although the parents may not want this to be corrected, it should be explained to them that a normal arch of teeth has a streamlined design which enables them to be self-cleansing during mastication. Irregularities of the teeth allow food to stagnate in areas between these teeth and thus cause decay, whilst calculus formation can occur on irregular teeth and eventually give rise to gingivitis and pyorrhœa. Orthodontic treatment is usually carried out on children between 8 and 16 years of age.

SUMMARY

These few notes are not meant as a comprehensive differential diagnosis of oral conditions. It is hoped that they will be a guide to the practitioner in his everyday work.

I would like to thank the many friends who have contributed to this article, and in particular Mr. A. Lindsay Murray, Consultant Dental Surgeon, Cardiff Royal Infirmary, Dr. Marcell Gang, and Dr. Stephen Gang, for their many helpful suggestions and encouragement.

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MYXOMATOSIS

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EARLY in 1896, the rabbits (*Oryctolagus cuniculus*) in the laboratory of the Institute of Hygiene in Montevideo began to sicken and die of a disease which had never been met with before. The disease was characterized by the production of numerous nodules and tumours, particularly on the head, neck and extremities, few of the animals surviving for more than two to five days after the appearance of these tumours (Sanarelli, 1898). The outbreak killed nearly all the rabbits in the laboratory and the origin of the disease remained a mystery until, in 1943, Aragão showed that the disease occurs naturally in the native wild rabbit of Brazil (*Sylvilagus minenitis*). The tumours in the naturally occurring disease are smaller and less numerous than those found in the domestic or European rabbit. Aragão also demonstrated that the rabbit may be infected by the bite of blood-sucking insects, such as mosquitoes and fleas, and, by showing that the proboscis alone is infectious, suggested that transmission of the virus is mechanical.

Aragão (1927) had previously put forward the idea that myxomatosis might be effective in controlling the rabbit in Australia and studies were made, both in Australia and at Cambridge, to test the feasibility of this proposal. Preliminary studies showed that the disease could not be transmitted to man, to the native Australian fauna or to the common domestic animals. Sanarelli (1898) had failed to infect mice, guinea-pigs, monkeys or fowl, and he produced nothing more than subconjunctival injection when he inoculated two human volunteers with the virus. Little could be done about introducing the disease, however, until it became known, through the work of Aragão in 1942, that myxomatosis is essentially an insect-borne disease, although workers in Australia had established that fleas and mosquitoes could transmit the disease. Based on an earlier observation of Aragão, they concentrated on the habitat most favoured by the stickfast flea (*Echidnophaga myremecobii*), but found that it was not a very efficient vector owing to its limited mobility, and it is of some interest, in view of the conflicting statements about predators, to note that foxes, by consuming the lethargic sick rabbits, could prevent the establishment of the disease (Ratcliffe *et al.*, 1952). Myxomatosis was much studied in the laboratory, but attracted little general interest until the great epizootics—all man-induced—which raged in Australia, and later in Europe, after the 1939-45 War.

THE EPIZOOTICS IN AUSTRALIA

In Australia the rabbit problem became very serious after the 1939-45 War, and it was decided to introduce the disease in districts where mosquitoes were likely to be prevalent. These early attempts gave disappointing results,

but in December 1950 the disease flared up in New South Wales, for reasons which need not concern us now, and a widespread epizootic followed. This ultimately involved an area of over a million square miles in South-East Australia and caused the death of tens of millions of rabbits, with an estimated annual saving of over £50 million to the agricultural industry there.

There can be no doubt that mosquitoes have played the major part in the dissemination of the disease in Australia, but other vectors may be of importance in spreading the disease in certain localities there. The general opinion is that the disease will become enzootic in that continent, and that the rabbit population will be permanently reduced, even though there are signs that an immune population is emerging and attenuated strains of the virus have been isolated (Fenner, 1953; Mykytowycz, 1953; Myers *et al.* 1954).

THE EPIZOOTIC IN EUROPE, 1952

In spite of isolated efforts to introduce the disease in Wales and Sweden, myxomatosis remained unknown outside the laboratory in Europe until June 1952, when a French doctor infected and released two wild rabbits on his country estate near Rambouillet, about 30 miles to the south-west of Paris. He succeeded in reducing the wild rabbit population on the estate by over 90 per cent., but the disease soon spread to neighbouring estates and, early in October 1952, the first rabbit dead from the disease had already been sent for examination to the Pasteur Institute, where the diagnosis was established: a diagnosis which intrigued those who participated in the investigation because they did not then know how the disease appeared in the field (Jacotot and Vallée, 1953).

Since then, the disease has spread widely through the greater part of Western Europe where it has virtually exterminated the rabbit population in places. It is likely to become enzootic there, as it will in Australia, but no-one can predict the ultimate outcome, such is our lack of ecological knowledge.

EPIZOOTIC IN ENGLAND, 1953

Myxomatosis made its first appearance in England early in October 1953, near Edenbridge in Kent. In view of the role of the rabbit flea (*Spilopsyllus cuniculi*) as vector in this country, it is probable that the virus was introduced here from the Continent on fleas which had straggled on to some bird, probably a carrion feeder, from the carcass of a rabbit recently dead from the disease. Further outbreaks followed in Sussex, Kent, Essex and Suffolk, in spite of an attempt to contain the disease, and even to stamp it out (Ministry of Agriculture, 1954). These efforts were unsuccessful and the committee formed to report on the disease recommended that it be allowed to take its course, pointing out the net economic gain of £35-£40 million, which would ensue if the wild rabbit could be exterminated in Britain.

The disease has continued to spread since then, and has now been reported in every county in Britain except Selkirk; although the rabbit popula-

tion in the Northern parts has not yet suffered severely from the disease. The committee expect the disease to spread still farther this year, and that it will kill many more rabbits than hitherto. It is expected that next winter will find the rabbit population reduced to its lowest level for over a century, and it is recommended that an attempt should be made to kill off as many of the survivors as possible, and thus eliminate the wild rabbit (Ministry of Agriculture, 1955).

THE DISEASE IN THE EUROPEAN RABBIT

The best description of the spontaneously occurring disease in the European rabbit is that given by Sanarelli (1898) in his original account of the malady. The incubation period is four to five days, and the first sign of infection is blepharo-conjunctivitis of both eyes followed, twenty-four to forty-eight hours later, by swelling of the lids, which pushes the eyeball back into the orbit, and is accompanied by a thick discharge from both eyes. At the same time tumours of various sizes begin to appear at different sites in the skin of the animal. The head and extremities, particularly the pads of the feet, are favoured sites. Nodules and tumours may be very numerous round the ears and neck: a fact of importance in the transmission of the disease by the mosquito, which bites for preference in these regions. The head and face of the sick rabbit become greatly changed, with thickening of the muzzle and nose, so that the face presents a leonine appearance characteristic of the disease, and gives the animal a revolting appearance. The anus and genitalia become acutely inflamed and swollen and in the female the nipples may become hypertrophied. In severe cases the whole surface of the body may be the seat of tumours, and when this stage is reached the rabbit usually survives for only a few days. Death commonly occurs on the ninth to tenth day of the disease. The mortality is over 99 per cent. in virgin populations, but recovery from the disease with subsequent immunity to reinfection was revealed by the finding of wild rabbits with severe scarring around the eyes and elsewhere, after the 1951 Australian epizootic. The serum of these rabbits was found to contain antibodies to myxoma virus (Fenner and Marshall, 1954).

Postmortem examination shows the characteristic tumours of the skin, with a gelatinous appearance and a firm elastic consistency. The spleen is usually swollen, the lymph glands are considerably enlarged, and there is inflammation of the testes in the male; otherwise there is little change to be seen on naked-eye inspection.

Histological examination shows subacute inflammation of the dermis and subdermis, and the affected epidermal cells show the characteristic cytoplasmic inclusion bodies, resembling the Paschen bodies of vaccinia, which are numerous in the so-called myxoma cells (or stellate cells). There is an intense reticular reaction in the spleen, which shows congestion with numerous lymphocytes, plasma cells and macrophages. The liver shows dilatation of the sinusoids, produced by accumulation of swollen reticulo-

endothelial cells, and the lymph glands are also the site of intense reticular activity (Jacotot, Vallée and Virat, 1954).

Fenner and Woodroofe (1953) have studied the pathogenesis of the disease and conclude that it evolves in a manner similar to that seen in mousepox and other generalized viral and bacterial diseases. The virus multiplies at the site of inoculation and spreads to the satellite lymph node, where it in turn multiplies and can be detected forty-eight hours after inoculation. The virus then spreads *via* the blood, and twenty-four hours later can be detected in many organs; by the fifth day it can be recovered from the conjunctival secretion, and on the sixth day the rash makes its appearance. The virus is not found free in the plasma, but is always associated with the blood cells during the viræmic phase of the disease. The vector does not transmit the disease by the blood which it consumes when feeding on the sick animal, but by mechanical contamination of the mouth parts with the virus during feeding. The vector bites through infected cells in the skin.

THE VIRUS

The virus which causes the disease belongs to the vaccinia or pox group of viruses. It has the same shape as that of vaccinia (Farrant and Fenner, 1953) and its measurements, using the electron microscope, have been estimated at $225 \times 225 \times 290$ mμ. In the infected cell, however, particles of various sizes with different electron densities can be found throughout the cytoplasm, extending from the nuclear membrane to the periphery of the cell (Epstein, Reissig and de Robertis, 1952). Several strains of virus are known, each with different virulence.

MODE OF TRANSMISSION AND VECTORS

The disease can be spread by direct contact with a sick animal, by fomites and by intradermal, subcutaneous or subconjunctival inoculation. The most important mode of transmission in nature is undoubtedly through contamination of the mouth parts of blood-sucking arthropods to which the virus becomes attached during feeding and is transmitted mechanically when they feed on another host. Mosquitoes, fleas and recently the sheep tick (*Ixodes ricinus*), have been shown to harbour the virus. In the natural disease among the native South American rabbit or tapeti, mosquitoes are believed to be the important vectors, and the distribution of the Australian epizootic suggests that they are the most important vectors there as well. In Europe, mosquitoes have certainly been responsible for some of the outbreaks, e.g., that in the Rhône Valley (Eychenne and Péres, 1954), but the European rabbit-flea (*Spilopsyllus cuniculi*) is believed to be the chief vector in Britain (Ministry of Agriculture, 1955).

Birds, particularly carrion feeders and scavengers, may play a part in the dissemination of the disease by carrying fleas which have straggled on to them from the cadavers of rabbits dead from the disease. It is of interest in this respect, to recall that bird fleas are believed to have evolved from

mammalian fleas and that the rabbit-flea is closely related to the shearwater flea (*Ornithopsylla lætitæ*). Shearwaters, it will be remembered, often nest in rabbit burrows. Man has helped to spread the disease, and the great epizootics now raging have, of course, been started by human agency. Farmers in Europe and in Ireland have deliberately spread the disease, and it has been suggested that it may have been introduced into this country by the wheels of motor cars, which had run over infected animals on the Continent (Stamp, 1955).

ALLEGED HUMAN CASES

It cannot be emphasized too strongly that there has been no case of the disease in any animal other than members of the Lagomorph order: native South American rabbit, cotton-tails, the European rabbit and a very few hares (Jacotot, Vallée and Virat, 1954; Deane, 1955). Man cannot be infected, although alleged human cases have been reported from time to time. I had the opportunity of seeing the first alleged human case in this country shortly after the first outbreak of the disease in Kent. The patient had conjunctivitis followed by impetigo (Moynahan, 1954).

There are several human maladies which bear a superficial resemblance to myxomatosis and which the patient or his relatives may confuse with the animal disease. These include: bullous erythema multiforme, Stevens-Johnson syndrome, atypical cases of chickenpox and smallpox, bullous dermatitis herpetiformis, pemphigus vulgaris, angioneurotic œdema, and certain drug rashes.

It should also be remembered that persons handling sick rabbits may develop localized or systemic infections, through cuts or abrasions, due to the common pyogenic organisms, and that these may give rise to anxiety in the patient and his relatives unless they are recognized for what they really are.

Similarly, unnecessary anxiety may be aroused if a domestic animal, such as a cat or dog, becomes ill after contact with an infected rabbit. There is no evidence that dogs or cats are susceptible to the disease any more than humans, and it should be remembered that carrion feeders and predators, such as foxes (close relatives of the dog) thrive on the diseased rabbits.

HUMANITARIAN AND ECONOMIC ASPECTS

There can be no doubt that if the sick rabbit did not present such a revolting appearance there would be less concern about the suffering inflicted by myxomatosis. It is difficult to know how much any animal suffers, but it is certain that the suffering cannot be as great as some stories would lead us to believe. In view of the widespread cerebral lesions, it is probable that the sick animal is not very much aware of its plight, and it would be fair to compare it with a severe human case of typhus, in which many of those who recover cannot remember their illness at all. Stories of suicide and of animals screaming with pain can certainly be disregarded as pure invention; the screams are more likely to come from a trapped animal than a sick one.

Nevertheless, the humane person will destroy sick animals if he can do so by quick and painless means.

The economic consequences of the extermination of the wild rabbit in this country have been dealt with in the 'First Myxomatosis Report' (Ministry of Agriculture, 1954), and it should be remembered that such an event would mean a saving to the nation equivalent to one-eighth of the cost of the National Health Service.

For rabbits kept as pets or in the laboratory, an effective vaccine is available which will give protection for over six months.

In view of certain possible developments it may be advisable to point out that it is illegal to import the cotton-tail rabbit (*Sylvilagus floridanus*) into this country. Attempts to cross the cotton-tail with the domestic rabbit, with a view to breeding a myxoma-resistant hybrid, have resulted in fertile eggs, but the embryos degenerated at or before blastulation (Chang and McDonough, 1955). If the cotton-tail were introduced into the British Isles we would have a pest with no economic saving graces (flesh, fur and skin), but a £50 million annual drain on the economy.

SUMMARY

The history of myxomatosis is reviewed briefly, and a short account is given of the recent great epizootics in Australia, Europe and the British Isles.

The clinical and pathological manifestations of the disease in the rabbit and its causative virus are described.

It is emphasized that no animal other than a Lagomorph can contract the disease; human diseases with a superficial resemblance to the animal disease are enumerated.

The economic and humanitarian aspects of the disease are discussed.

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GENERAL PRACTITIONERS' FORUM

PAROXYSMAL VENTRICULAR TACHYCARDIA SIMULATING CORONARY INFARCTION

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PAROXYSMAL tachycardia is a relatively common condition in general practice. When the paroxysm is supraventricular in origin, the heart is normal in about 60 per cent. of cases. In the rarer ventricular type, 80 per cent. of the cases exhibit organic heart disease. Should the attack be excessively prolonged, with a cardiac lesion already present, failure may ultimately develop, and even myocardial infarction may occur in the presence of coronary disease. In a series of 20 cases of paroxysmal ventricular tachycardia investigated by Hejtmancik and Herrmann (1947) coronary disease was present in 70 per cent. of the patients. During a paroxysmal attack, the electrocardiogram is pathognomonic and, after the attack, in a small number of cases, changes are seen in the T waves which resemble the pattern of myocardial infarction. It is generally recognized that the longer the attack, the more pronounced is the abnormality of the T waves, and that the converse is also true. According to Campbell (1942), this anomaly does not necessarily indicate organic disease but is a completely reversible process due to some degree of exhaustion or strain of the heart muscle. Thus, the transient nature of the electrocardiogram, which reverts to normal after three to four weeks, serves to differentiate the condition from infarction.

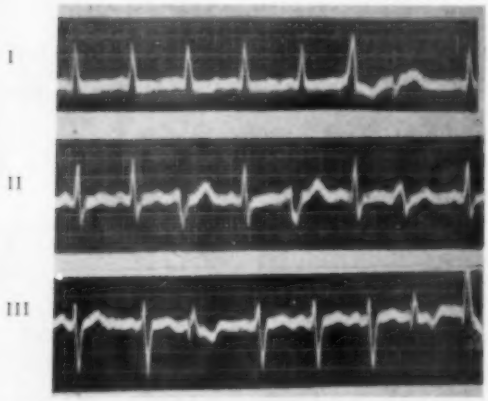

FIG. 1.—Electrocardiogram taken in April 1951, showing normal rhythm with left axis deviation and ventricular extrasystoles.

When extreme peripheral collapse develops after an attack of paroxysmal ventricular tachycardia, the diagnosis can only be established by the aid of the electrocardiogram, as shown in the following case.

CASE RECORD

The patient, a woman aged 57 years, was seen by me originally on April 18, 1951, when she was complaining of dyspnœa on exertion. On

examination the pulse rate was 90 per minute and regular in rhythm. There was no evidence of heart failure. The maximum cardiac impulse was 1 inch outside the midclavicular line in the sixth left intercostal space, and was forcible. The heart sounds were normal. The blood pressure was 250/125 mm. Hg. The retinal vessels exhibited a moderate degree of arteriosclerosis. No abnormality was to be found in the respiratory system. An x-ray of the heart revealed an enlarged left ventricle, and the electrocardiogram showed left axis deviation with occasional ventricular extrasystoles (fig. 1). She was treated with sedatives and was told to rest more at home, where she worked as a dressmaker.

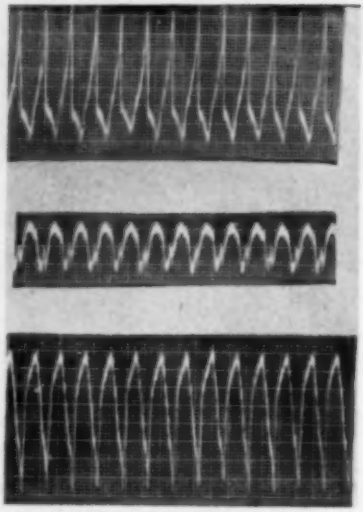

FIG. 2.—Electrocardiogram taken on May 13, 1951, showing paroxysmal ventricular tachycardia.

On May 13, I was called to see her urgently at about noon. Her husband stated that on the previous evening she had been troubled with palpitations and had gone to bed early. After a restless night she awoke about 10 a.m. and had an attack of vomiting which lasted for about a quarter of an hour. She later became very agitated and delirious and remained in this state. She had not complained of any pain in her chest. When I examined her she was in a state of extreme shock with peripheral vascular collapse. The skin was of an intense pallor and the extremities were cold. Respiration was slow and shallow. She was completely irrational. The pulses at the wrist were impalpable. The heart sounds were feeble, the rate being approximately 180 to 190 per minute. The blood pressure was unobtainable. A diagnosis of coronary infarction was made. She appeared so ill that it was considered inadvisable to move her to hospital.

Nikethamide, 1.8 ml., was administered intramuscularly and warmth was applied to the extremities. The foot of the bed was raised. I was able to obtain an immediate electrocardiogram which showed evidence of paroxysmal ventricular tachycardia, the rate being approximately 200 per minute (fig. 2). At 2 p.m., 1.5 mg. of digoxin was injected intravenously and the nikethamide was repeated. At about 4 p.m. she began to show signs of improvement and the pulse could now be felt at the wrist, the rate being 120 per minute, and the colour of the skin was beginning to return to normal. Two hours later she was able to sit up by herself and ask for a cup of tea. She could not remember the sequence of

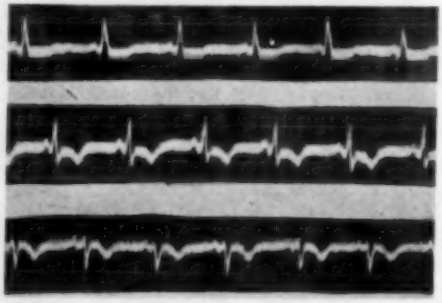

FIG. 3.—Electrocardiogram taken on May 14, 1951, showing normal rhythm with inversion of T_2 and T_3.

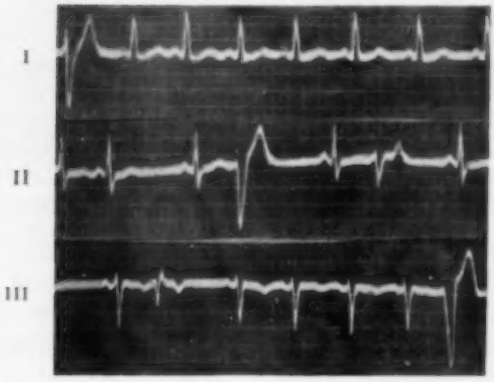

FIG. 4.—Electrocardiogram taken on June 10, 1951, showing normal rhythm, ventricular extrasystoles and inversion of T_3.

events during the morning. The heart rate was now 120 per minute and the blood pressure was 120/80 mm. Hg. She was seen every two hours up to midnight when the pulse rate had diminished to 90 per minute and the blood pressure remained stationary at 120/80 mm. Hg. On the following day a second electrocardiogram was taken, showing re-establishment of normal rhythm, the rate being now about 60 per minute (fig. 3); T_2 and T_3 were sharply inverted. The patient appeared to be perfectly well. The blood pressure was 150/90 mm. Hg. A blood count taken two days later was within normal limits, and the E.S.R. gave a reading of 11 mm. in the first hour. She was kept in bed for about a fortnight and at the end of that period allowed to get up, her blood pressure being 180/110 mm. Hg. During that period she was completely afebrile.

A third electrocardiogram on June 10 showed T_3 still negative, with ventricular extrasystoles (fig. 4). The blood pressure was 225/120 mm. Hg. A final electrocardiogram taken a month later showed that T_2 and T_3 had returned to normal (fig 5.). She was allowed to carry on with her work but advised to restrict her activities for the next few months. She has had no recurrence of attacks since that time. When seen in June 1954, the blood pressure was 195/125 mm. Hg and she was living a perfectly normal existence.

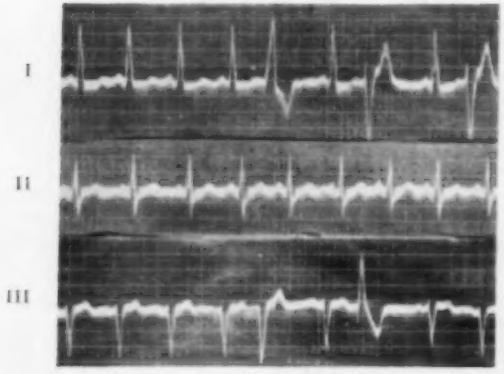

FIG. 5.—Electrocardiogram taken in July 1951, showing normal rhythm with persisting ventricular extrasystoles, but T now upright in all three leads.

DISCUSSION

This case illustrates a cardiac emergency arising in practice, where treatment could not be instituted without the diagnostic aid of the electrocardiogram. The sudden onset of peripheral vascular collapse was so suggestive of coronary occlusion that the diagnosis of this condition did not seem unreasonable. It is probable that in the absence of rational

therapy, ventricular fibrillation would have developed, with a fatal termination.

The treatment of paroxysmal ventricular tachycardia is varied. Physical measures involving reflex vagal inhibition by way of the carotid sinus, often successful in auricular tachycardia, are of no avail. Of the many drugs employed, such as mecholin, prostigmine, procaine amide, digitalis, and quinidine, the last has been regarded as the most effective. Kayden *et al.* (1951) have reported a high proportion of successes with procaine amide, whilst Szekely (1946) was able to terminate the paroxysms by intravenous injection of 20 ml. of a 20 per cent. solution of magnesium sulphate. Digoxin, so often of great benefit in auricular tachycardia, rarely produces the same effect in the ventricular type. In this case, however, whether *post hoc* or *propter hoc*, its administration was followed by the restoration of sinus rhythm.

SUMMARY

A case of paroxysmal ventricular tachycardia is described with signs and symptoms highly suggestive of coronary occlusion. Stress is laid on the importance of an early diagnosis in order that immediate treatment can be instituted in the presence of a damaged heart when there is a real threat to life.

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CONJUGAL VOMITING

By GUY DE SILVA, M.B., B.S., D.C.H.
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'I GET a splitting headache early in the mornings often accompanied by vomiting—almost every third day', was the complaint of a young country doctor (34 years). The duration of the illness was five years. 'Instead of my getting morning sickness my husband gets it', was the wife's comment. They had no children.

THE HISTORY

The attacks came on fairly suddenly and lasted about half a day or more. They were worse if the bowels were costive or after a glass of beer taken the previous night. Most of the attacks were accompanied by the vomiting of a little bile-stained fluid. Nothing taken orally (e.g. aspirin, 'gynergen' tablets) gave relief. When the headache was mild he attended to his professional work and even played tennis in the evenings. An injection of 'gynergen' relieved him in a few hours and he felt quite fresh. A 'soneryl' or a 'dial' tablet at bedtime was also of benefit on occasion. A purgative was always taken during the attack, if it had not been taken the night before.

There was no previous illness of note, except a mild attack of measles

and chickenpox about a year previously. He had fractured his right femur in a car accident (the car went over a precipice of 80 feet), but fully recovered. He was a non-smoker and took only an occasional glass of beer. He played tennis almost every evening.

THE EXAMINATION

The eyes were examined by a visiting eye surgeon and were found to be normal. He consulted a visiting physician of a general hospital who could find no cause for the attacks. As the patient was about to go to England for postgraduate work and a holiday, he thought that the sea voyage and the stay in England might benefit him.

The illness continued even during his stay in England. He then consulted the senior physician of a well-known London teaching hospital in May 1952. The blood picture, urine reports, x-ray examination of the skull and sinuses were all found to be normal and the consultant's comment was: 'I find nothing wrong'. He then consulted a distinguished neurologist on the staff of the National Hospital for Nervous Diseases, Queen Square. After a complete examination he, too, said that there was nothing wrong and excluded the diagnosis of migraine. He advised him to take phenobarbitone, ¾ grain (50 mg.) every night for six months. But there was no improvement.

THE CURE

But one fine morning, his wife, with whom he had led a very unhappy life, as they had quarrelled since the day of their marriage, deserted him. The following day all the headaches and vomiting had vanished. To date neither wife, headache nor vomiting has returned.

DIAMINODIPHENYLSULPHONE IN DERMATITIS HERPETIFORMIS

By Flight Lieutenant ANTHONY CASPERS, M.R.C.S., L.R.C.P.
Royal Canadian Air Force

The introduction of diaminodiphenylsulphone (D.D.S.) in dermatology has raised the question of its uses and limitations, and at present it is under trial at a number of dermatological clinics in the United Kingdom. Recent observations have suggested that this drug is of particular value in the treatment of dermatitis herpetiformis (Cornbleet, 1951; Kruizinga and Hamminga, 1953).

Dermatitis herpetiformis, a disease of unknown etiology, is characterized by the polymorphism of the eruption and the itching. Any part of the body may be affected although the mucous membranes are involved in only about 2 per cent. of cases. Both sexes may be affected, and attacks may last weeks or months, with periods of freedom lasting years. It is often found that the

lesions take the form of circinate serpiginous areas, upon which arise small herpetiform vesicles and/or bullæ. The associated intense itching leads to the vesicles being scratched and so, in turn, to secondary infection. Thus the patient's health, which generally remains good, may be undermined by sleeplessness, resulting from irritation and secondary infection.

The differential diagnosis usually lies between dermatitis herpetiformis and pemphigus vulgaris, although bullous impetigo, erythema multiforme, lichen urticatus and patchy vesicular eczema may cause confusion.

CASE REPORT

The patient, a leading aircraftman aero fireman, aged nineteen years, was admitted to the Royal Air Force Hospital, Cosford, on June 2, 1954, having served one year and eight months in the Royal Air Force on a regular engagement. For as long as he could remember he had suffered every summer from recurrent attacks of 'blisters' arising on the hands, feet and head. These attacks, lasting for two or three months each year, and accompanied by considerable irritation, were succeeded by periods of complete freedom for the rest of the year. Before joining the Royal Air Force he was treated as an inpatient at two different hospitals and had been obliged to give up two civilian jobs (house painter and printer) on account of the condition. These facts were not disclosed to the Royal Air Force Medical Board at the time of entry, and routine examination revealed nothing abnormal, as he was then free from lesions.

In September 1953, when he was posted to the Middle East, the attacks began again and persisted without remission. There was no significant family history.

On admission (fig. 1 (a)) he looked fit but numerous polymorphic lesions and scratch marks were found on the face (erythematous blotches), the chest (erythematous blotches and vesicles), both hands (vesicles and bullæ) and both feet (vesicles and bullæ). The vesicles were less than 2 cm. in diameter. Nothing abnormal was found on the mucous membranes. Both legs showed signs of old healed lesions.

(a) (b)

FIG. 1.—Case of dermatitis herpetiformis treated with diaminodiphenylsulphone. (a) Before treatment: note the erythematous blotches, vesicles and scratch marks on the face and chest. (b) After treatment: note the two small, rapidly clearing, residual areas on the left side of the chin and the right side of the neck.

Investigations.—A positive response was obtained when 20 per cent. potassium iodide was applied to a portion of the polymorphic chest eruption. The blood count was within normal limits: red blood cells, 4.4 million per c.mm.; hæmoglobin, 13.69 g. per 100 ml.; white blood cells, 6,600 per c.mm. (2 per cent. eosinophils). The blood sedimentation rate was 3 mm. in the first hour. A specimen of fluid taken from an unruptured bulla on the right foot and examined microscopically revealed an eosinophil count of 800 per c.mm. Cells scraped from the floor of a fresh bulla showed no degeneration.

Thus the clinical diagnosis of dermatitis herpetiformis was supported by the pathological findings. The low eosinophil count in the blood was not at variance with the diagnosis since it is recognized that an eosinophilia is present in only about half the cases (Roxburgh, 1950).

Treatment.—The patient was kept at rest in bed and given a light diet. Calamine lotion containing 12 per cent. of solution of coal tar B.P. was applied daily to all affected areas. In addition, daily potassium permanganate baths were given and sub-erythematous doses of ultra-violet light.

During the first sixteen days he was given arsenical solution B.P. (Fowler's solution), 5 minims (0.3 ml.) thrice daily. During this period there was a slight improvement which started on the fourth day and lasted eight days, followed by a marked exacerbation. No manifestations of arsenical intolerance were encountered.

On June 23, the Fowler's solution was replaced by diaminodiphenylsulphone, 50 mg. daily. Within two days there was a noticeable improvement, and the dose was gradually increased until by July 14 he was receiving 50 mg. four times daily.

By July 20, all the lesions had disappeared with the exception of a small polymorphic area on the right wrist, but it was noticed that a fine tremor had developed in both hands. In the absence of other findings it was considered that this was a manifestation of intolerance to this upper dosage level of 200 mg. daily and dosage was therefore reduced to 50 mg. thrice daily. Within seventy-two hours the tremor had disappeared and did not recur again during his stay in hospital. Neither anæmia nor methæmoglobinæmia was encountered. Ten days after this reduction of dosage a new bullous area developed on the right forearm. Subsequently the cautious addition of a fourth daily dose of 25 mg. of D.D.S. (on August 7) was followed by a slow but gradual improvement in all areas (fig. 1 (b)).

The patient was finally discharged from hospital on August 16, on a maintenance dosage of 175 mg. daily (50 mg. thrice daily and one additional daily dose of 25 mg.) A final blood count (August 13) gave the following result: R.B.C. 3.9 million per c.mm.; Hb. 80 per cent.; colour index 0.9. The troublesome itching was readily controlled with promethazine hydrochloride.

SUMMARY

A case of dermatitis herpetiformis treated first with arsenical solution B.P. (Fowler's solution) and then with diaminodiphenylsulphone is described. The superior results obtained with the diaminodiphenylsulphone are noted. A mild intolerance to this drug is also recorded.

I am grateful to Group Captain H. E. Bellringer, Principal Consultant in Dermatology to the Royal Air Force, for his criticism and advice and to Burroughs Wellcome and Company for their cooperation. I should also like to thank the radiography department of the Royal Air Force Hospital, Cosford, for taking the photographs, and the Director-General of Medical Services for permission to publish this article.

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WAR AND CALLISTHENICS

THE WORK OF PHOKION HEINRICH CLIAS (1782-1854)

By W. H. G. ARMYTAGE, M.A.
Professor of Education, University of Sheffield

THE paradox that war can actually promote the physical well-being of those engaged in it can be illustrated from the period 1740 to 1815, when England was almost continually at war on several fronts. An army physician in Flanders, John Pringle, helped to stress the need for adequate ventilation in his 'Observation on the Diseases of the Army' (1752), and a naval surgeon in the West Indies, James Lind, showed that scurvy could be conquered by the use of preserved orange and lemon juice, a remedy which, when employed by Gilbert Blane in 1782, cured the complements of twenty-eight ships of the line. Incidentally, Blane ultimately secured an Admiralty order commanding the use of lemon juice in 1795.

THE INTRODUCTION OF PHYSICAL EDUCATION

The paradox can be equally well illustrated when one looks at Europe as the seat of most eighteenth century wars, which witnessed a number of experiments to improve the physique of the child. Berhard Basedow's Philanthropinum employed the 'knightly exercises' of vaulting the horse, dancing, fencing and riding, and John Simon, its physical training master, varied these by introducing the old Greek exercises of running, jumping, wrestling and throwing. His successor, Du Toit, added more—swimming, marching, climbing up a ladder with the steps set obliquely, balancing and climbing. Other institutions, founded in imitation of the Philanthropinum, improved these still further; especially teachers in Salzmann's Schepfenthal Educational Institute—Christian André and J. C. F. Gutsmuths (1759-1839). The latter was a pioneer of physical education and his book, 'Gymnastik für die Jugend' (1793), was the first manual of physical instruction written by a teacher. He followed it up three years later with 'Spiel zur Uebung und Erholung des Körpers und Geistes, fur die Jugend, ihre Erzieher und alle Freunde unschuldiger Jugendfreuden'.

The importance of Gutsmuths' work, when all the countries of Europe were flexing their national strength against Napoleon, was appreciated in England, and a translation of his first book was published by J. Johnson in 1800. Gutsmuths' list of activities included military exercises, as well as sentry work, oratory and going without food. And significantly enough, it was a Swiss Army Officer who gave Gutsmuths' ideas a wider currency than they might otherwise have had.

EARLY DAYS

This officer, P. H. Clias (1782-1854), was born in the United States of

America, where his father had emigrated in 1770. The elder Clias fought as an officer in the War of American Independence and then settled in Boston where Phokion Heinrich Clias was born. The elder Clias died while on his way to Holland in 1791 to place the boy at Groningen, and young Clias ran away to sea, becoming a cabin boy on a Dutch ship. He was captured, and spent some time as a prisoner of war in England. On his release he wandered in Holland and North Germany, and at the age of twenty-seven married the daughter of a wealthy citizen of Oldenburg, near Bremen. In 1814, as an officer in the Swiss army, he introduced exercises such as vaulting, swimming and wrestling to keep his soldiers out of mischief, and the following year gave free instruction in gymnastics to the orphan asylum at Berne. So successful was he that the authorities made him professor of gymnastics and riding master at the academies. In 1816, he published his modification of Gutsmuths' teaching, and himself began to train teachers in the Swiss cantons.

PARIS AND LONDON

Switzerland, however, could not afford him sufficient scope, so he tried Paris and attempted, both in 1817 and 1820, to obtain a post there. He was given an opportunity to test his system on three companies of light riflemen. These experiments attracted the attention of English officers in the army

FIG. 1.—'Gymnastics for Youth'. An engraving from 'The Every-Day Book', by William Hone (1826, vol. 1). An accompanying note states that 'the engraving is placed before the eyes of parents and teachers with the hope of directing their attention to gymnastic exercises, as diversions for youth, and they are referred to a practical treatise on the subject by Mr. Clias, that may be safely used'.

of occupation. This is not surprising as the new system of drill and manœuvre which Sir John Moore had introduced at Shorncliffe camp when he founded the light infantry corps laid great stress on 'exercises of activity, with or without arms'. 'The captains and other officers of the Corps' were instructed 'to show every encouragement to their men, to amuse themselves at the game of cricket, hand or football, leap-frog, quoits, vaulting, running, foot races, etc., and in short all manly and healthy exercises'. Indeed, one of his officers, who later became a general and historian of the Peninsular War, Sir William Napier, took Moore's advice so literally that he was 'ever eager to excel in all feats of activity, going and competing with the soldiers in all their sports', and was delighted when he was the victor.

It was not surprising therefore that the light infantry should take to Clias. He was invited to England in 1822, and was gazetted captain and superintendent of physical training in the Royal Military and Naval Schools. Following this, he published an English version of his book (a French version had already been published four years earlier) entitled 'An Elementary Course of Gymnastic Exercises'.

This ran to four editions in two years, and illustrates the essentially military nature of Clias's task. It is chiefly notable for the last two of its four chapters, where he outlines exercises on the parallel bars (fig. 1), and describes a new style of swimming which he claimed to have exploited in Germany in 1809—the breast stroke. He stayed in England for three years.

LATTER DAYS

In 1825 he was struck by a falling pupil and retired to Berne, where his life seems to have been spent in some obscurity. He emerged once more, in 1841 at Besançon, as teacher of gymnastics in both the school and the garrison—by now he was nearly sixty. Three years later he returned to Paris as superintendent of gymnastic instruction in the elementary schools. In 1848, revolution drove him once more back to Switzerland where he died six years later, in 1854, at Berne. He bequeathed a sum of money to ensure that his skeleton should be exhibited in the Natural History Museum as a testimony to the beneficial effects of the system he had spent a lifetime elaborating.

As a postscript it is of interest to note that six years after Clias's death, Lord Elcho, who in 1854 had introduced the Medical Practitioners' Bill, presided over a meeting at the Thatched House Tavern 'for the purpose of establishing military drill in public schools'. As a result, not only did Rugby, Harrow, Eton, Westminster and other schools introduce such drill, but, in 1861, a gymnasium was built at Aldershot and a corps of instructors was organized under the command of Major Hammersley. The Aldershot gymnasium led to the establishment of others in the same year at Skegness, Woolwich, Portsmouth and Chatham.

CURRENT THERAPEUTICS

XC.—ANTIMALARIAL DRUGS

By BRIAN MAEGRAITH, M.B., D.Phil., F.R.C.P.
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In this article the chemotherapy of the malarial attack and the chemoprophylaxis and suppression of malaria are considered separately. Modern usage of antimalarial drugs is based upon the life cycle of the parasite in the human host. It is therefore necessary to describe the essential features of this life cycle before discussing the details of drug administration.

THE LIFE CYCLE OF THE MALARIA PARASITE

The life cycle of the *Plasmodium* begins with the injection by the infected anopheline mosquito of sporozoites which enter the parenchymal cells of the liver in which, after six to eight days, merozoites are formed. These escape into the blood stream and invade erythrocytes, initiating the asexual erythrocytic (E) cycle of the parasite, which is responsible for the clinical attack. The original infection of liver cells, which precedes that of the erythrocytes, is called the pre-erythrocytic or PE phase of the parasite.

In *P. falciparum* infections the PE phase is believed to disappear soon after the E cycle has become established, so that the patient with clinical falciparum malaria has an erythrocytic (E) infection only. Relapses in this form of malaria thus arise from the persistence of the E forms of the parasite in the blood. In other forms of malaria, typified by *P. vivax* infections, the liver infection persists as the exo-erythrocytic or EE phase. The patient with clinical malaria thus harbours both the erythrocytic (E) and the exo-erythrocytic (EE) phases of parasite. Relapses are believed to arise from reinfection of erythrocytes by merozoites arising from the persistent EE liver forms.

THE CHEMOTHERAPY OF MALARIA

The technique of the treatment of a given case of malaria depends largely upon the species of infecting *Plasmodium* and the degree of resistance to infection offered by the patient.

The species of plasmodium.—Because of the difference in the life cycle of the parasites, the problems of the immediate treatment of the clinical attack and of the prevention of subsequent relapse differ in *P. falciparum* and other infections.

In *P. falciparum* malaria both therapy and prevention of relapse centre round the control and eradication of the erythrocyte (E) parasite only. In *P. vivax* (and also *P. malariæ* and probably *P. ovale*) malaria, treatment of the clinical attack is concerned with eradication of the E forms and prevention of relapse with the eradication of the persistent liver (EE) forms.

Treatment in a specific instance thus depends upon the species of invading *Plasmodium*. It is necessary therefore to establish the species diagnosis in order to plan the therapy of a given case.

Acquired resistance.—It is important to attempt some assessment of the likely state of immunity or resistance to infection offered by the individual patient, since acquired resistance tends to modify the clinical attack and may therefore be important in natives of an endemic area who are continually exposed to reinfection by the same strain of parasite. Patients may be grouped broadly into: *non-immunes*, who are unlikely to have acquired resistance; for example, visitors to an endemic area, not previously exposed to the local infection; and *immunes* or *partial immunes*, who are likely to have acquired resistance: for example, natives of an endemic area living in that area.

Available drugs.—There are several potent and effective compounds available, but unfortunately no single one of them can be regarded as the perfect antimalarial. That is to say, there is no drug which can always be relied upon in all circumstances to act as a true preventive against infection, to cure the clinical attack, and to prevent subsequent relapse.

SCHIZONTICIDES

These are drugs capable of dealing with the erythrocyte (E) forms of parasite.

QUININE

Preparations.—Tablets of the bihydrochloride, hydrochloride or sulphate, containing 4 or 5 grains (0.25 to 0.3 g.); ampoules containing powder or solution in doses of 7.5 or 10 grains (0.45 or 0.6 g.) for parenteral administration.

Effect on parasite.—Acts quickly on early forms of E parasites. Sexual forms of *P. vivax* affected slowly; those of *P. falciparum* not affected. Does not affect EE forms.

Toxicity.—With therapeutic dosages there is some tinnitus, dizziness and, occasionally, nausea. There may be sensitivity rashes. In large doses quinine can cause abortion, but this is unlikely on ordinary regimes. Very large doses may lead to blindness.

MEPACRINE

Preparations.—Tablets containing 100 mg. of the hydrochloride; ampoules containing powder (methane sulphonate, 375 mg., equivalent to 300 mg. of the hydrochloride) for solution and parenteral use.

Effect on parasite.—Similar to that of quinine but a little slower and acting a little later in the E cycle; no effect on EE forms.

Toxicity.—On therapeutic dosage, severe temporary psychotic symptoms may develop; these disappear soon after cessation of the drug. High dosage causes acute gastro-intestinal symptoms, including vomiting and diarrhœa. Long-continued suppressive dosage causes harmless yellow staining of the

skin and occasionally may lead to bluish skin lesions resembling lichen planus.

PROGUANIL ('PALUDRINE')

Preparations.—Tablets containing 100 mg. or 25 mg. of the hydrochloride.

Effect on parasite.—Similar to that of mepacrine but slower. Resistance occurs in some species of parasite which renders the drug ineffective. No effect on EE forms, but there is a specific effect on PE forms of *P. falciparum* (see p. 728).

Toxicity.—Usually none beyond slight gastro-intestinal discomfort. Very large dosage has led to hæmaturia, especially in children.

THE 4-AMINO-QUINOLINES

These drugs, first synthesized in 1937, were developed during and after the 1939-45 War.

Chloroquine

The diphosphate of the base is called *chloroquine*, the sulphate '*nivaquine*'.

Preparations:

Chloroquine tablets containing 250 mg. of the diphosphate, equivalent to 150 mg. of base.

'*Nivaquine*' *tablets* containing 200 mg. of the sulphate, equivalent to 150 mg. of base. '*Nivaquine*' *ampoules* containing 5 ml. of a solution containing 200 mg. of base, for parenteral use.

Effect on parasite.—Same as mepacrine.

Toxicity.—Very low. There may be some gastro-intestinal discomfort. Blurring of vision, with irregular scotoma, occasionally occurs.

Amodiaquine ('camoquin')

Preparations.—Tablets containing 200 mg. of base.

Effect on parasites.—Similar to chloroquine.

Toxicity.—Similar to chloroquine.

DRUGS CAPABLE OF DEALING WITH THE LIVER FORMS OF THE PARASITE

8-AMINO-QUINOLINES

Pamaquin

Preparations.—Tablets, usually of naphthoate, containing 8 to 10 mg. of base.

Effect on parasite.—Destroys sexual forms of parasites. Most important effect is eradication of persistent liver EE forms of parasites. Also probably acts on PE forms.

Toxicity.—Very toxic. Little margin between therapeutic and toxic dosages. May cause methæmoglobinæmia, acute colicky abdominal pain, renal obstruction from crystallization and, in sensitive subjects, acute hæmolysis associated with hæmoglobinuria.

'Primaquine'

Probably the best of the recently introduced 8-amino-quinolines, which include pentaquine and isopentaquine.

Preparations.—Tablets containing 7 mg. or 15 mg. of the base.

Toxicity.—Said to be less toxic than pamaquin.

PROGUANIL ('PALUDRINE') (see p. 727)

Effect on parasites.—Acts on PE form of *P. falciparum* only. No direct action on sexual forms of parasite, but inhibits full development in mosquitoes.

PYRIMETHAMINE ('DARAPRIM')

Preparations.—Tablets containing 25 mg. of base.

Effect on parasites.—Similar to that of proguanil.

Toxicity.—None.

TREATMENT OF UNCOMPLICATED *P. falciparum* INFECTIONS

(Malignant Tertian Malaria)

NON-IMMUNES AND PARTIAL IMMUNES WITH SEVERE ATTACKS

The object of treatment is the eradication of the erythrocyte (E) forms. Any powerful schizonticide will usually succeed in this. The patient must be kept in bed. An input/output fluid record should be kept and each specimen of urine measured and examined for albumin and blood pigments. Patients should be encouraged to drink freely. The dosage schedule is as follows:—

Chloroquine or chloroquine sulphate

Adults:

Day 1. Immediately:	4 tablets (600 mg. base)
6 hours later:	2 tablets (300 mg. base)
Day 2.	2 tablets (300 mg. base)
Day 3.	2 tablets (300 mg. base)
Day 4. (Optional)	2 tablets (300 mg. base)

Children:

1 to 6 months:	Day 1: ¼ tablet 4 times
	Day 2: ¼ tablet only
	Day 3: ¼ tablet only
	(Total dose 1¼ tablets)
7 to 9 months:	Increase to a total of 2 tablets
10 months to 2 years:	Day 1: ½ tablet 4 times
	Day 2: ½ tablet only
	Day 3: ½ tablet only
	(Total dose 3 tablets)
2 to 5 years:	Increase to a total of 4 tablets
6 to 10 years:	Increase to a total of 5 tablets
Over 10 years:	Increase rapidly to adult dose of 10 tablets

Amodiaquine

Adults:

Day 1. Immediately: 3 tablets (600 mg. base)
Day 2. 2 tablets (400 mg. base)
Day 3. 2 tablets (400 mg. base)

Children: In same proportion as chloroquine.

Mepacrine hydrochloride

Adults:

Day 1. 3 tablets (300 mg.)
Day 2. 2 tablets (200 mg.) } all thrice daily
Days 3 to 7. 1 tablet (100 mg.)

Children (Total daily dose given for 5 to 10 days: maximum depending on size of child):

Birth to 1 year: 50 mg. (½ tablet)
1 to 2 years: 100 mg. (1 tablet)
3 to 5 years: 150 to 200 mg. (1½ to 2 tablets)
6 to 10 years: 200 to 300 mg. (2 to 3 tablets)
11 to 15 years: 300 to 400 mg. (3 to 4 tablets)
Over 15 years: Build up adult dose.

Proguanil and Pyrimethamine

These two drugs are now seldom used for treatment of cases in this category.

IMMUNES OR PARTIAL IMMUNES

The object of treatment is the control of the E form of the parasite. Eradication of the parasite is not demanded. The clinical attack is often very mild and may not require treatment in bed. Any of the regimes mentioned below should be successful. The best results are often obtained with the 4-amino-quinolines, especially amodiaquine. Proguanil should not be used where the existence of a drug-resistant strain of parasite is suspected. The dosage schedules are as follows. (Doses given are those for adults. Children are dosed in proportion to their body weight.)

Chloroquine or chloroquine sulphate.—4 tablets (600 mg. base) given *once*.

Amodiaquine.—3 tablets (600 mg. base) given *once*.

Mepacrine.—3 to 5 tablets (300 to 500 mg.) given *once*.

Proguanil.—3 to 5 tablets (300 to 500 mg.) given *once*.

Quinine.—4 tablets (20 grains (1.3 g.)) given on 2 successive days.

TREATMENT OF *P. vivax*, *P. malariæ* AND *P. ovale* INFECTIONS

(Benign Tertian, Quartan and Ovale Malaria)

NON-IMMUNES AND PARTIAL IMMUNES WITH A SEVERE ATTACK

The E forms of the parasite can be eradicated by any schizonticide, given

in doses as for *P. falciparum* infections. The persistent EE forms can be eradicated only by the use of the 8-amino-quinolines.

Radical cure of vivax infections thus requires a combination of a schizonticide and an 8-amino-quinoline. Such combined treatment leads to rapid control of the clinical malaria and radical cure of the infection in about 95 per cent. of cases. If a relapse occurs after treatment a further course of combined therapy is indicated.

If there is an overt attack, a schizonticide should always be given in conjunction with the 8-amino-quinolines. This applies also to mixed infections in which *P. falciparum* is concerned.

Eradication of EE forms in the absence of a clinical attack.—The 8-amino-quinolines are sometimes used alone in order to eradicate the EE forms of parasites during quiescent stages when there is no clinical attack. This technique has been used recently with great success in American troops exposed to vivax malaria in Korea. The relapse rate in *P. vivax* infections fell to negligible proportions in troops treated with primaquine, 15 mg. daily for 10 to 14 days, during their passage back from Korea to America.

The 8-amino-quinolines are toxic. The patient receiving combined treatment must therefore be kept in bed and given plenty of fluids. An input/output fluid chart should be kept and each specimen of urine should be measured and examined separately for albumin and blood pigments. Toxic symptoms are unlikely to appear on the dosage recommended below. The development of any side-effects, including 'cyanosis' due to methæmoglobin formation and abdominal colic, indicates the cessation of treatment. The dosage schedule for combined treatment is as follows:—

Combined quinine and pamaquin.—Quinine, 10 grains (0.6 g.) thrice daily. Pamaquin 8 or 10 mg. (base) thrice daily. Given concurrently, with a draught of water. The patient thus receives 30 grains (2 g.) of quinine and 24 to 30 mg. of pamaquin each day. Treatment is continued for 10 days.

Proguanil, 100 mg. thrice daily, may be substituted for quinine. Alternatively, the ordinary 3-day course of chloroquine or chloroquine sulphate may be given in place of the quinine. In either case pamaquin is continued for the full 10 days.

Mepacrine should not be used in conjunction with the 8-amino-quinolines.

'*Primaquine*' may be used instead of pamaquin, in dosages (continued for 10 days) of 7 mg. (base) thrice daily or 15 mg. *once* daily.

IMMUNES AND PARTIAL IMMUNES

The object of treatment is to control the E forms of the parasite. Radical cure is not achieved.

One- or two-day courses of treatment with a schizonticide are usually successful. Details of treatment are the same as for *P. falciparum* infections.

THE TREATMENT OF PERNICIOUS MALARIA

Pernicious forms of malaria are almost invariably due to *P. falciparum*.

Parenteral administration of schizonticides is indicated in all pernicious

attacks (except blackwater fever) when there is heavy parasitæmia (over 5 per cent.) or whenever patients are unable to take drugs by mouth, for example, because of intractable vomiting.

As soon as the patient has recovered sufficiently, oral therapy should follow.

PARENTERAL ADMINISTRATION OF DRUGS

Emergency treatment may be given with quinine, chloroquine or mepacrine. Drugs may be given intravenously or intramuscularly. It is usual to administer the first dose of a drug by syringe. Subsequent doses may be added to intravenous infusions of saline. Intravenous therapy is preferable in the adult. The intramuscular route is often more practicable in small children.

QUININE

Intravenous therapy is rapid, effective and safe. The dose for an adult is 7.5 to 10 grains (0.45 g. to 0.6 g.). The powder or solution in the ampoule is taken up in 10 to 15 ml. of sterile physiological saline or sterile pyrogen-free water. The solution is then drawn into a large syringe and injected slowly through a small-bore needle. The injection should take about ten minutes. Strict asepsis is necessary and the solution must not be allowed to leak round the vein.

The dose can be repeated in eight hours if necessary. Not more than three injections should be given in twenty-four hours; two are usually enough.

Intramuscular therapy is given in the same doses as above. The quinine is taken up in about 10 ml. of sterile physiological saline or sterile water and injected into the buttock with the strictest aseptic technique. Occasionally an abscess may develop at the site of injection.

Under the age of 4 years intravenous injection can be made *via* the internal jugular vein. Intramuscular therapy is usually preferred.

4-AMINO-QUINOLINES

The sulphate of chloroquine (*'nivaquine'*) is obtainable in ampoules of 5 ml., containing the equivalent of 200 mg. of the base. The contents of the ampoule are taken up into 10 to 15 ml. of sterile physiological saline or pyrogen-free sterile distilled water, and injected slowly, as for quinine. The dose can be repeated after eight hours. Not more than three doses should be given in twenty-four hours.

The results of this and similar dosage regimes are very satisfactory. Intravenous chloroquine sulphate may ultimately replace quinine therapy. The same dosage may be given intramuscularly.

The hydrochloride, supplied in aqueous solution in ampoules, is also given intramuscularly, in doses of 200 to 300 mg. of the base for an adult. This is a useful method of therapy in children.

MEPACRINE

The contents of the ampoule (375 mg. of methane sulphonate) is taken

up in about 9 ml. of sterile water and injected into the buttock with aseptic precautions. The dose can be repeated in eight hours. Not more than three doses should be given in twenty-four hours. As in the case of quinine, abscesses occasionally develop at the site of injection.

Recent observations suggest that intramuscular mepacrine may not be suitable for children.

CHEMOPROPHYLAXIS AND CHEMOSUPPRESSION

No drug exists which can destroy sporozoites. Hence true prophylaxis in the sense of complete prevention of infection is not yet attainable.

Some compounds prevent the full development of the pre-erythrocytic (PE) phase of the parasite and so prevent the invasion of the erythrocytes and the appearance of the E cycle. These substances are said to exert *causal prophylaxis*. The 8-amino-quinolines show such action, but are too toxic for general use. Proguanil and pyrimethamine have causal prophylactic effect in *P. falciparum* infections only. No satisfactory causal prophylactic exists for other forms of malaria.

The control of malaria by drugs, apart from the case of *P. falciparum* quoted above, depends on suppression: i.e., the control of the erythrocytic (E) phase of the parasite. In *P. falciparum* infections, in which there are no persistent liver forms, complete eradication of the E forms, i.e. radical cure, commonly occurs in the course of suppressive treatment. In *P. vivax* and other infections in which persistent liver forms exist, the E forms may be eradicated but relapses are likely to occur after cessation of suppressive treatment, as a result of reinfection of the erythrocytes from merozoites derived from the persistent EE parasites.

In falciparum infections therefore it is possible to aim at causal prophylaxis or at suppression plus radical cure. Relapses will not follow successful therapy.

In other forms of malaria, suppression may be achieved while the subject is taking the drug, but relapses will tend to follow cessation of therapy, since the persistent EE forms are unaffected.

Drugs must be taken regularly throughout exposure and for at least a month afterwards. Irregular dosage is inefficient and may be dangerous in producing a false sense of security or, in the case of quinine, in predisposing to the appearance of blackwater fever. As will be seen below, some drugs should be taken daily, others weekly. In either case a habit must be formed. Most subjects find it easier to remember a daily dose than a weekly one. Each dose should be taken with a drink. Absorption and antimalarial action are not affected by alcohol in moderation.

DETAILS OF DOSAGE FOR PROPHYLAXIS AND SUPPRESSION

The 4-amino-quinolines, mepacrine, proguanil and pyrimethamine are the drugs most commonly used. They are all effective. Quinine should only be used when other drugs are not available.

If the drug recommended is not affording protection, another should be tried. In some areas parasites are resistant to proguanil. Cross-resistance exists between proguanil and pyrimethamine: evidence of resistance to one therefore excludes the use of the other.

Individuals who have already been exposed to infection should be given a full therapeutic course of mepacrine, chloroquinine or proguanil before being placed on a standard suppressive or prophylactic regime. It is customary not to give the same drug for therapy as for suppression. As in chemotherapy, different regimes of treatment are usually preferred for non-immunes and partial immunes.

NON-IMMUNES

The 4-amino-quinolines

Chloroquine and chloroquine sulphate

Adults: 2 tablets (300 mg. base) *once weekly*.

Children: Birth to 2 years: ¼ tablet once weekly
3 to 5 years: ½ „ „ „
Over 6 years: 1 „ „ „
Over 10 years: Adult dose

Amodiaquine.—Same dosage in tablets.

Method.—Start treatment the day before entry into an endemic area, or a fortnight before to establish habit. Continue for 4 doses after leaving infected area.

Action: P. falciparum.—Suppression leading to radical cure.
Other forms.—Excellent suppressive. Relapses likely to follow.
Toxicity.—Occasional gastro-intestinal discomfort.

Mepacrine

Adults: 1 tablet (100 mg.) daily.

Children: Birth to 1 year: ½ to ¾ tablet per week
2 to 5 years: 1 to 2 tablets per week, in daily divided doses
6 to 10 years: 2 to 3 „ „ „ „
11 to 15 years: 3 to 4 „ „ „ „
Over 15 years: Full dose

Method.—It is essential to start at least 14 days before entry into endemic area. Continue for one month after leaving.

Action: P. falciparum.—Suppression leading to radical cure.
Other forms.—Effective suppression. Relapses likely after stopping regime.

Toxicity.—Occasional gastro-intestinal upsets during early stages of regime. After years exposed skin goes browny-blue, sometimes with eruptions. Blue discoloration of gums and palate and brown discoloration of nails are also common late effects.

Proguanil

Adults: 1 tablet (100 mg.) daily.

Children: Birth to 1 year: 25 to 50 mg. ($\frac{1}{4}$ to $\frac{1}{2}$ tablet) daily
2 to 5 years: 50 to 100 mg. ($\frac{1}{2}$ to 1 tablet) daily
Over 5 years: 100 mg. (1 tablet) daily

Method.—Can be started on day of arrival in endemic area, or 14 days before in order to acquire habit. Continue for one month after leaving endemic area.

Action: P. falciparum.—Causal prophylaxis. If patient is already infected, suppression leading to radical cure. Not effective if proguanil-resistant strains are present.

Other forms.—Effective suppression. Relapses likely after cessation of dosage.

Toxicity.—Occasional gastro-intestinal discomfort.

Pyrimethamine

Adults: 1 tablet (25 mg.) once weekly.

Children: Birth to 12 years: $\frac{1}{2}$ tablet (12.5 mg.) once weekly
Over 12 years: 1 tablet once weekly

Method.—Begin on day of entry into endemic area, or earlier to produce habit. Continue for 4 doses after leaving area.

Action.—As for proguanil.

Toxicity.—None.

SUMMARY

TREATMENT

Treatment depends on the individual state of immunity, and upon the species of parasite.

P. vivax (*benign tertian*), *P. malariæ* (*quartan*) *and P. ovale infections.*—*Non-immunes:* Radical cure follows combined treatment in 95 per cent. of cases; schizonticide (e.g. quinine) to eradicate the blood form of parasite plus 8-amino-quinoline (e.g. pamaquin) to deal with the persistent liver (EE) form. *Immunes:* A short course of schizonticide only is required; radical cure is not attempted.

P. falciparum (*malignant tertian*) *infections.*—*Non-immunes:* Radical cure is obtained with a full course of schizonticide. *Immunes* as above.

CONTROL

Non-immunes: Causal prophylaxis is achieved only in *P. falciparum* infections—with proguanil or pyrimethamine. Suppression is obtained with regular courses of schizonticides in all forms of infection. In falciparum malaria, radical cure usually results; in other forms of malaria relapses commonly follow cessation of suppressive therapy.

Immunes: Small regular doses of schizonticides give a high degree of protection.

MY MOST INTERESTING CASE

V.—POST-CRICOID CARCINOMA

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It would be easy to describe various cases by reason of their interest in one or two respects, but that to be referred to here includes many aspects of general principle and application. It is only towards the end of a career that it seems possible to profit by the lessons of the earlier days and then it is becoming late to turn the knowledge so gained to advantage.

The case under review was that of a lady of 47 years of age, with a growth at the upper end of the œsophagus, spreading over the back of the larynx, of a type generally known as post-cricoid carcinoma.

The first lesson, as the result of numerous experiences over many years, is that this disease often follows chronic inflammatory changes in the crico-pharyngeal fold, best described as chronic hypo-pharyngitis. Sometimes there are similar inflammatory changes in the tongue and also secondary anæmia. To the combination of these three signs the name of the Paterson-Brown-Kelly syndrome has been applied; but as the affection at the mouth of the œsophagus often occurs without the other associated changes this eponymous description is seldom applicable. Obviously, if it is agreed that chronic hypo-pharyngitis can be a precursor of post-cricoid carcinoma, the inflammatory disease must be treated and arrested, even, if necessary, by excision of a limited area of the crico-pharyngeal fold with retention of the larynx.

When a growth is well established the diagnosis is easily made by direct inspection; biopsy can be carried out, but delay must not be allowed to occur because the pathologist fails to find positive evidence of malignant changes in the fragment submitted to him. One learns the lesson that certain naked-eye appearances indicate the presence of a particular disease and of none other. Although of great value in many instances, the pathologist's confirmation of the diagnosis is not essential, and if the pathological diagnosis conflicts with the clinical diagnosis it must take second place. Failure to adopt this opinion has led to disastrous results in many cases referred to me, particularly those with intra-laryngeal carcinoma, advanced because of prevarication.

From long experience I have learned that if a widespread carcinoma is present on the back of the cricoid cartilage, there will most certainly be infiltration of the laryngeal tissues or lymphatics. The conclusion is that drastic treatment is required, comprising removal of the lower segment of the pharynx, the upper end of the œsophagus, the whole of the larynx and the neighbouring lymphatics and glands. To avoid so radical a procedure, trial has been made, over the course of many years, of irradiation in its many methods of application. The opinion I have formed, and it is accepted by many others, is that irradiation is unsuitable for the treatment of this condition. It is better to be inflexible on this point and not to imagine that perhaps in a particular case success may be obtained by irradiation,

when the lessons of the past contradict this false optimism. Because of this attitude, unnecessary suffering and withholding of correct operative treatment are a daily occurrence in malignant disease of the larynx and pharynx.

The obvious reaction of the patient to the recommendation of a severe and somewhat mutilating operation, is the desire to know whether the sentence is irrevocable. As in previous experiences, so in the case under description, the patient sought the opinion of others, but was confirmed in her decision to accept the advice first given. Having cleared her mind she placed herself unreservedly in my care, with the resolution that there was no real alternative. It is one of the greatest privileges of the surgeon to find that if he devotes his mind to the solution of a problem to the best advantage of the patient, he will be given unswerving support: I have had it said to me more than once that if I advised the patient to have his or her head cut off, the decision would be accepted without question. Much is heard about the indecision of patients, of actions for wrongful treatment, or of negligence, but to me the opposite side presents itself, namely the marvellous confidence of so many in their medical advisers.

Having decided on the operation and received the consent of the patient, the next conclusion, dictated by previous experiences of malignant growths, was that early excision was desirable, without preliminary fashioning of skin flaps or other plastic procedures. A further lesson learnt is that a malignant growth should be removed entire with attached lymphatics and glands. In the present instance this necessitated complete block dissection of one side of the neck, partial dissection of the other side and removal of the hyoid bone, larynx, part of the pharynx and the œsophagus almost as far as the sternum, all in one piece. Furthermore, it is highly desirable, in my opinion, to restore structures, wherever situated, so far as possible to their previous state at the time of a radical operation. In this case the restoration was attained by the insertion of a specially moulded tube covered with a skin graft, over which the skin flaps were brought together. The whole operation occupied about three and a half hours.

When healing of the skin was complete the patient left hospital with the tube n position and was able to swallow with comparative ease. She drove a car, rode a horse and enjoyed other diversions while the tube was maintaining patency of the newly formed pharynx. Strictures subsequently formed and had to be dealt with, but the necessary operations were tolerated well by a patient whose growth had been removed and who had enjoyed a period of swallowing by the normal route.

The final lesson is that the subject of so radical an operation can become restored to almost normal life, after learning a new method of speech acquired by inspiring air into the œsophagus, and causing it to vibrate and thus produce sound as it escapes through the pharynx.

To recapitulate. The reasons for particular interest in this case are: the desirability of preventing the formation of a growth in this region, the decision to excise it without delay when once diagnosed, the fortitude of the patient and her unwavering confidence, and her final ability to become restored to an almost normal life.

REVISION CORNER

TREATMENT OF FRIGIDITY IN WOMEN

WHEN a woman comes to a general practitioner complaining of frigidity the problem invariably appears to be her inability to participate fully or to achieve satisfaction in intercourse with her husband. Underlying this is a number of factors which require careful and full investigation before an accurate diagnosis can be arrived at.

PHYSICAL CAUSES

Physical investigation usually demonstrates that the woman cannot relax sufficiently to permit full penetration without discomfort. The most common organic reasons for this include: (a) a tight and fleshy hymen, sometimes partially ruptured, sometimes intact and with a small orifice; (b) an unusually small vagina; (c) inflammation of the vagina; (d) cervical erosion; (e) a vaginal polyp; (f) a caruncle. In such cases the first step should be to try to deal with the local condition and in a few cases this is all that is required, but in the vast majority the results are disappointing.

It has been suggested that some glandular imbalance may account for frigidity, but there is no evidence to support this and no form of glandular treatment has any lasting effect. It is true that women are least inclined for coitus in the pre-menstrual and menstrual phase and that many show an increased desire in the post-menstrual period, but in cases of frigidity there is usually no post-menstrual desire.

FAULTY TECHNIQUE

It is important to investigate the technique employed by the husband. Not infrequently he fails to stimulate his wife as a lover; he regards intercourse as a purely physical act and his orgasm is so rapid that the woman has not time to be roused and is left completely unsatisfied. Women often have sexual dreams in which they experience orgasm either in relation to their own husbands or some other man or even without any male person appearing in the dream, but they are not able to have it in their waking hours when their consciousness is in control. This may be due to the husband's faulty technique or to some psychological cause.

FEAR OF CHILDBIRTH OR PREGNANCY

In some cases there may be a fear of having children either because of the fear of actual childbirth or of pregnancy or because circumstances would make it inconvenient to have a child or because there are already young children or the woman feels that she is too old to want to have another baby. In these cases the only alternatives to abstinence are the use of coitus interruptus which usually leaves the woman unsatisfied, and the use of contraceptives. Many women greatly dislike using a cap because they feel that it is, as they say, 'so cold-blooded', and women who have any psychological distaste for coitus are usually completely put off by the idea. On the other hand, a number of men find they cannot use a sheath and some women also find the use of a sheath unpleasant.

In some cases, however, the woman masks her psychological distaste for coitus under the guise of fear of childbirth or other objections to having a child, such as bad housing conditions.

PSYCHOLOGICAL FACTORS

The next step is to investigate any psychological factors. To do this effectively it is necessary to obtain the patient's confidence. Any suggestion of reproach or of taking the matter too lightly will immediately cause the patient to withdraw all confidence from us and either seek help elsewhere or feel that the situation is hopeless. To elicit the psychological factors it is essential to obtain the history not only of the woman's marital experiences but also of the way in which her emotional patterns have been built up in relation to sex and her attitude towards it. In practically every case we find that the woman's attitude to sex is an unhappy one, usually heavily weighted with guilt and fear, and that this attitude derives from her earliest childhood and that it was due to the parents' own sexual attitude.

Nearly every child tends to handle its body including its genital organs or to expose itself as a perfectly natural phase of development. It is often also curious in relation to the bodies of its playmates, especially those of the opposite sex. This unfortunately embarrasses adults, who reproach or punish the child in most cases or at least make it clear that he has done something extremely reprehensible. Thus, the tiny child's first experience of pleasure in relation to his own body or those of his playmates is almost invariably associated in his mind with shame and probably punishment. This attitude to anything relating to sex tends to be reinforced, not only by the parents but by everyone around—school, church and society in general —at every stage of the child's development; especially is this so when he or she first begins to feel the adolescent type of erotic pleasure. The taboo is far more severe in the case of girls than in the case of boys. It is therefore not surprising that a girl of what one might call a sensitive temperament, with a strong sense of right and wrong and a great respect for grown-up opinions, tends to develop an attitude of guilt and fear in relation to her own sexual impulses. The higher her standard of moral values the more will she be inclined to repress her sexual urges. Once a pattern of this kind is formed it may easily become irreversible so that the girl never permits herself to fall in love with a man sexually; although she may appear to be very much in love, it is probable that she is romanticizing and glamourizing the marriage relationship so that it has little resemblance to reality. Alternatively, she may regard her husband as a father figure or marry with the object of having a home and fulfilling herself in her children. When, after marriage, she is faced with the actuality of intercourse it often happens that her fears and sense of guilt are aroused to such an extent that she cannot respond spontaneously. The effect of this on the husband, especially if he himself has rather similar feelings, is only too often to prevent a satisfactory mating.

One of the difficulties is that biologically men achieve their climax more quickly than women and this naturally reinforces the difficulties of the situation. If the man's climax is over before the woman's is achieved she is left with a feeling of frustration and of tension both emotionally and physically, and any hesitation or fear she may have had in regard to the sex act is naturally greatly increased. Many women are averse from permitting any caressing or love-play as a prelude to coitus because they have been brought up to believe that this would be immoral and indecent. The man, in many cases, fails to understand the emotional difficulties underlying his wife's apparent rejection of his love and feels either that he has failed her as a lover or that she is cruelly withholding herself from him. She, only too often, takes refuge in the attitude that physical love is an animal type of

love and unworthy of human beings and that therefore her husband is wrong in expecting it from her, whereas she is pure and noble because she does not desire it.

TREATMENT

Biologically, every human being of both sexes is endowed with the ability to feel physical love. The inability to express it is therefore a derived disability. Theoretically, then, it should be possible to overcome this disability but in fact it is often impossible to do so. In some cases, however, much can be achieved if both the husband and the wife can be brought to a full understanding of each other's emotional attitudes and the way in which these have developed. It is impossible to say beforehand which cases will respond and which will not, and therefore it is essential that every woman who comes to a doctor complaining of frigidity should be given the benefit of this full investigation, and both she and her husband should be seen—at first separately and then together. As this requires a considerable amount of time and experienced handling, it is often extremely difficult for the general practitioner to treat such a case adequately. Nevertheless, there are some who can be helped by relatively short and superficial treatment on these lines. In cases which do not respond at once the proper course is to send them to a psychiatrist, since the longer the situation goes on the worse it gets.

PREVENTION

There is no doubt at all that if girls and boys, especially girls, were brought up with the right approach to sex from the start these unfavourable patterns would rarely develop. It is in the home therefore that we must look for the first step in prevention. The second line of preventive treatment would lie in premarital advice bureaux, which are even more necessary than marriage guidance clinics because they work at a truly preventive level. By the time the sexual relationships in a marriage have gone so wrong that a doctor is consulted, in all too many cases the task has become a formidable one. Nevertheless, there are few in which we cannot do something, at least to ameliorate the situation even if we cannot establish an entirely satisfactory marital relationship.

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MENINGISM

MENINGISM is a symptom and is not in itself a disease. Its importance lies in its relatively common appearance in the course of a number of different diseases and its clinical resemblance to acute meningitis. Meningism may therefore be defined as a condition which presents the clinical symptoms and signs of a pyogenic or virus meningitis without gross change in the cerebrospinal fluid.

CLINICAL PICTURE

This condition appears most commonly in children as a concomitant of severe generalized infection, such as pneumonia, diphtheria, erysipelas, scarlet fever, dysentery and occasionally malaria, and is an indication of an acute toxic encephalopathy—a non-specific reaction of the nervous system to profound infec-

tion. By the time symptoms first appear the diagnosis of the primary disorder is usually clear. The onset is nearly always sudden, with high fever, drowsiness or coma, vomiting and sometimes convulsions. Neck stiffness is always present; it sometimes appears to be part of a generalized muscular rigidity of cerebral rather than meningeal origin. By contrast, the cerebrospinal fluid, although under increased pressure, is usually both chemically and cytologically normal. The course of events will depend largely upon the nature and severity of the causative infection and the patient's response to treatment. In the majority of patients the neurological symptoms and signs disappear rapidly—within twenty-four to forty-eight hours, leaving no sequelæ. Occasionally, however, more definite evidence of brain damage appears and is indicated by prolonged stupor, hemi- or mono-plegia, speech disturbance, or prolonged and repeated fits. During subsequent recovery severe mental change may appear and may persist. Death may occur, and again it must be emphasized that this is to be attributed to the primary disease rather than to the cerebral manifestations. Post-mortem examination shows that there are diffuse areas of softening of the brain with proliferative changes in the small cerebral vessels. Acute inflammatory changes are not seen, and the meninges appear normal.

IN CHILDREN

It will of course be clear that this description applies to patients presenting meningism as a symptom of a relatively small group of severe infections. Headache and neck stiffness with positive Kernig sign may, however, appear in other conditions of considerable diversity. The most common, and perhaps the most misleading of these, particularly in children, is the association with acute otitis media. It need not be stressed here that a small child with any painful condition about the head or neck may seem to have neck stiffness and the suspicion of meningitis may thereby be raised. Otitis media, however, is more sinister in view of the relative frequency of intracranial spread of infection, and it must be remembered that well-marked signs of meningeal irritation may appear without any concomitant change in the cerebrospinal fluid; such signs constitute a danger signal and call for active measures. It is probable that in the presence of such signs with a purulent otitis antibiotic therapy alone is not sufficient to guard against further intracranial spread of infection.

It is well known that the majority of the exanthemas, as well as influenzal infection, may at times be complicated by encephalitis of more or less specific type. In its mildest form such encephalitis presents as 'meningism' with little or no change in the cerebrospinal fluid, and it is probable that this complication occurs most commonly with measles. The onset is usually at about the sixth day of the rash which has already started to fade, and when the temperature is falling or is normal. The temperature suddenly rises again, irritability, drowsiness and neck stiffness appear, and there may be convulsions. Recovery is usually rapid in the course of two or three days and there are no permanent ill-effects.

IN ADULTS

The above remarks are for the most part particularly, although not specifically, applicable to children for it is in childhood that meningism most often appears. Meningism does, however, occur in adults, although the causal disease is usually

obvious. Thrombosis of intracranial venous sinuses, either aseptic (usually puerperal) or in association with local or generalized sepsis, may at the onset result in severe headache with neck stiffness; the subsequent course of events may make the diagnosis clear. Neck stiffness is common in uræmia, in the acute episodes of hypertensive encephalopathy, and in typhoid fever.

DIFFERENTIAL DIAGNOSIS

Little difficulty should arise in the differential diagnosis of 'meningism' for, as has already been stressed, it is a symptom of the disease which causes it. Only rarely is the condition likely to be confused with true meningitis. Benign lymphocytic meningitis is readily distinguished by the characteristic lymphocytic pleocytosis in the cerebrospinal fluid, and by its short uncomplicated course. The occurrence of an unexplained stiff neck during an epidemic of poliomyelitis should be treated with great respect, and it should be borne in mind that trauma to muscles, bones and to intervertebral discs can all produce neck stiffness. Finally, the enlarged tender posterior cervical glands of German measles or chickenpox have in the past been known to mislead.

DAVID KENDALL, D.M., M.R.C.P.
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NOTES AND QUERIES

Persistent Post-Herpetic Neuralgia in the Elderly

QUERY.—I should be grateful for advice regarding a patient of mine, aged 76, who has a severe and persistent post-herpetic neuralgia in the sciatic distribution, which has been present for the last four years, and which has resisted all treatment including analgesics and x-rays. He is most insistent that the condition has reached a point where relief must be obtained, even if this entails drastic measures. I have been unable to discover whether any relief has been obtained by neurosurgeons in this condition.

REPLY.—The pain of post-herpetic neuralgia generally tends to diminish in severity over the course of approximately two years. In the case quoted the pain has persisted for an unduly long period and the prospects of obtaining relief are not good.

The three neurosurgical procedures to be borne in mind are posterior rhizotomy, chordotomy and prefrontal leucotomy. Rhizotomy is not to be recommended since it will almost certainly prove to be ineffective. Antero-lateral chordotomy is successful in some cases and is worth considering; it is advisable to tell the patient that there is some likelihood of his obtaining relief following this operation and that in any case his condition will not be aggravated. Prefrontal leucotomy must be regarded as a last resort. It would be reasonable to recommend it only if the patient finds his life unbearable or his mental state is such that he shows suicidal tendencies. There are considerable hazards to this operation in a patient aged 76 whose cerebral vessels are probably arteriosclerotic. Moreover, because at this age personality changes are usually marked following leucotomy, the patient's domestic situation is an important consideration. Before contemplating such a 'drastic measure' it might be worth assessing the effects of chlorpromazine if this has not already been tried. It should be given in doses of 25 mg. three or four times daily, but there is some risk of liver damage resulting from prolonged administration of this drug.

A. N. EXTON-SMITH, M.D., M.R.C.P.

Postmaturity in Domiciliary Midwifery

QUERY.—I should be grateful for advice regarding the treatment of postmaturity in domiciliary midwifery. As a rule, I administer a 'medical induction' (2 ounces [57 ml.] of castor oil, a hot bath, and a warm soap-and-water enema) at the end of the 41st week.

Has 'pitocin' a place in domiciliary practice, and, if so, what is the best method of administration?

REPLY.—The pregnant woman who becomes 'overdue' will remain a source of some anxiety until we know what truly constitutes post-maturity, how it can be diagnosed, and how we can infallibly induce labour in an easy and safe manner. It seems definite that there is an added risk to the baby, and disadvantages to the mother, if pregnancy exceeds its normal span by fourteen days or more. However, the onset of 'normal' labour cannot be regarded as so fixed in timing that under- or over-running its theoretical date is necessarily abnormal. Thus, the wholesale induction of labour based on the supposed date of term is not indicated. Admittedly, simple medical induction as suggested is unlikely to do any harm if labour starts; but it may only give rise to further anxiety if it fails. Drugs such as quinine and 'pitocin' are best avoided, as they may give rise to irregularity of contractions and stress on the baby.

In domiciliary midwifery perhaps more than in hospital work, undue attention may be drawn to 'term'. When this supposed date has been passed and labour has not started the proper thing to do is to review every single aspect of the history and the physical signs of the case very carefully indeed. If any abnormality is found—and this may include maternal age in relation to gravidity as well as presentation and size of baby—then it is better to refer the woman to hospital. If all seems otherwise normal the indication for induction is increasing size of the baby in relation to the pelvis. If medical induction is then thought to be indicated it is only logical to be willing to follow with surgical methods should it fail. Simple induction is more likely to succeed in multiparæ.

In postmaturity there appears to be little risk of death of the baby before the onset of labour, but a definitely increased chance of this during labour. Careful observation should therefore be made of the fœtal heart and clinical course of the delivery, so that either episiotomy or forceps delivery can be carried out when indicated, or that the woman may be admitted to hospital even in the first stage of labour should there be worry as to the condition of the baby, when, on occasion, even Cæsarean section may be necessary.

KENNETH BOWES, M.D., M.S., F.R.C.S.

Post-Immunization Oculogyric Crises

QUERY.—Recently my young daughter, aged almost eight months, was given her first inoculation against diphtheria and whooping-cough. The next day she had what must have been very short-lasting oculogyric crises; her eyes flicked up for two or three seconds. They lasted only the one day and she was, and has remained, absolutely normal in other respects. I presume this is a sign of transient slight cerebral irritation. Do you think it wise to continue with the immunization injections?

REPLY.—It is a rare but recognized occurrence after combined diphtheria and whooping-cough immunization to have reactions which vary from a transient flicker to a full convulsion. This more commonly follows the combined injection and especially if it contains the non-suspended whooping-cough vaccine. The suspended type of vaccine is virtually free from reactions.

In this particular case I would advise continuing with a suspended whooping-cough vaccine; i.e., giving two further injections of 1 ml. at monthly intervals and following this a month later with 0.5 ml. of A.P.T.

PROFESSOR A. G. WATKINS, M.D., F.R.C.P.

Micropenis in Infancy

QUERY.—I should be grateful for advice on the following case:—The child, now aged eighteen months, is physically perfect and completely healthy and normal except for a small defect which I feel will have a pronounced psychological effect later on in life and may be a worry from the point of view of later function. He has an anatomically correct but very small penis which even now, though he has slimmed down to a young child's physique, is not apparent unless forcibly exposed by suprapubic pressure. Both testes are in a normal scrotum. His urethra opens at the glans. I can find no evidence of hermaphroditism. Is there any line of treatment one could adopt? At what age should it be given and what would be the risks, if any, or complications of such therapy?

REPLY.—The great majority of children brought to hospital in the belief that the penis is underdeveloped possess a perfectly normal organ concealed within the suprapubic pad of fat, but it would appear from the statement that the child has already slimmed down that the case in question is one of true micropenis. In this rare condition the penis will always remain much below the normal size, though there will be some growth and development, particularly at puberty. In adult life such a penis may be functionally inadequate, though it would be a mistake to underestimate the potentialities of even the smallest, and young men suffering from feelings of inferiority on this account would be well advised to read the unexpurgated version of the Arabian Nights, wherein are recorded

some of the remarkable feats of their fellow-sufferers.

No satisfactory treatment exists, but a trial of hormone therapy is probably worth while. Pituitary hormones, such as 'antuitrin S' (500 units three times a week for eight weeks), will induce some development if normal testicles are present; this treatment should not be employed much before the age of puberty, as if used earlier there will be a regression after cessation of treatment. If there is a concomitant testicular underdevelopment, testosterone may be used, preferably by the implantation of a 100-mg. tablet on several occasions at three-monthly intervals. This treatment is also better left until adolescence as there is some danger that it will permanently inhibit testicular development.

D. INNES WILLIAMS, M.D., M.CHIR., F.R.C.S.

'Drinite' Treatment of Nocturnal Enuresis

QUERY.—A small boy, aged 7 years, has had nocturnal enuresis since babyhood. Various forms of drug therapy and psychotherapy have been tried, but without success. His parents have heard of an electrical gadget used in these cases in New Zealand. It would appear to be some form of shocking device which awakens the child on bed-wetting. I would be grateful if you could provide me with any information about this.

REPLY.—The apparatus referred to, which is now commercially available as the 'Watson Victor "Drinite" ' apparatus, was developed by Dr. Neil D. Crosby of the University of Adelaide (*Med. J. Aust.*, 1950, **ii**, 533). The principle of the device is that a mild electrical stimulation is applied to the abdomen through electrodes on a body belt. The stimulus is actuated by the first drop of urine making contact with a separate set of electrodes applied over the genitalia, which causes a reflex action of the sphincter muscle and so prevents further micturition. At the same time a visual and auditory signal warns the nurse or parent of the onset of micturition so that the patient may be permitted to void in the usual manner.

The results of treatment are good in persistent enuretics, but I do not usually recommend its use in a child under the age of 9 years because it requires the child's cooperation, and also because the majority correct themselves between the ages of 6 and 8 years.

LAWRENCE LUDBROOK, M.B., F.R.C.P., F.R.C.A.P.

Choroid Sclerosis

QUERY.—Could you please tell me something about choroid sclerosis, its pathogenesis, etiology, prognosis and treatment?

REPLY.—Histologically, sclerosis of the choroidal vessels is a normal senescent change present as early as about the age of 40; it is also a constant feature in renal neuro-retinopathy. These histological changes are not discernible ophthalmoscopically and probably give little functional disturbance. The condition that is recognizable clinically as sclerosis of the choroidal vessels is in all probability a different pathological entity, for the picture it represents is of occlusion of the choroidal vessels and their conversion into white bands. In turn this ophthalmoscopic picture is probably seen in several distinct clinical entities, for choroidal sclerosis is observed in the late stages of some cases of trauma, in some inflammatory reactions of the fundus and, most typically, as a hereditary affection. The hereditary form of choroidal sclerosis is in turn seen in several well-defined types. In one type the whole of the fundus shows choroidal vessels converted into white streaks; in another form the anomaly is sharply localized to the posterior pole giving what the older observers called central senile areolar choroidal atrophy. In yet a third type the lesion is essentially peripapillary, radiating from around the disc. The mode of inheritance of these different types is not yet clearly established. It is likely that it is generally recessive, but there is some evidence that in certain families the central type of choroidal sclerosis is dominant.

The difficulties in interpretation of choroidal sclerosis are increased by the fact that the choroid appears to be involved secondarily in many of the hereditary retinal lesions, so that in any particular case it may be difficult to determine whether the lesion is primarily retinal or choroidal. However, an accurate diagnosis of choroidal sclerosis is generally a matter of academic interest, for the conditions with which it may be confused are all exceedingly severe. There is no treatment.

PROFESSOR ARNOLD SORSBY, M.D., F.R.C.S.

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Sorsby, A. (1939): 'Choroidal angio-sclerosis with special reference to its hereditary character', *Brit. J. Ophthal.*, **23**, 433.
——, and Crick, R. P. (1953): 'Central areolar choroidal sclerosis'. *Ibid.*, **37**, 129.

Angioneurotic Œdema

QUERY.—A male patient, aged 40 years, sustained an injury to the right side of his head (but no fracture) and was away from work for almost six months. Ten days after resuming work he developed angioneurotic œdema of the eyelids—rather more pronounced on the right than on the left eye.

Could this be attributed to the mental worry and upset consequent upon a realization of his shortcomings in capacity for work even after such prolonged rest? There is no hereditary or familial element in this case. The œdema is variable—at times considerably limiting his field of vision. Excision of overhanging tissues has been of little use. The result of skin tests was negative. Would administration of adrenaline be of any use—if so, in what dosage?

REPLY.—Assuming that the diagnosis of angioneurotic œdema is correct, the suggestion that it might have been precipitated by the patient's uncertainty as to his ability to cope with his work following a long period of invalidism, is a reasonable one in the presence of negative skin tests.

Antihistamines are sometimes helpful in the management of angioneurotic œdema, and various preparations could be tried. Adrenaline is often useful but should not be given in more than 0.3-ml. doses of 1 in 1000 solution unless the patient's reaction is very well established. If adrenaline is effective it might be possible to prevent attacks by giving a slow-acting adrenaline, such as hyperduric adrenaline, 1 mg. in 1 ml., in doses of 0.5 ml. The frequency of the injections depends, of course, upon the length of their action in the individual patient.

J. S. RICHARDSON, M.V.O., M.D., F.R.C.P.

Splenectomy in Thrombocytopenic Purpura

QUERY.—A boy, aged 4 years, within normal limits as regards his physical standards, began to bruise easily after dental extractions, which caused a severe loss of blood, in August 1954. He was sent to a children's hospital, where the diagnosis of thrombocytopenia was made. His blood platelet counts have varied from 24,000 to 196,000 per c.mm. The child's general condition is good. There is a family history of pernicious anæmia.

I should be grateful for advice on the value of splenectomy in this case. The spleen is not enlarged.

REPLY.—I presume that secondary thrombocytopenia has been excluded in this patient and that the diagnosis is considered to be idiopathic thrombocytopenic purpura. There is a high rate of spontaneous recovery from this condition and the problem is to know when splenectomy, the risk from which nowadays is slight, should be considered. In this patient it seems justified to allow the condition a full year in which to regress. If at the end of this time symptoms still persist, a spontaneous remission is unusual and splenectomy should be undertaken; this will almost certainly abolish the symptoms. In leaving the boy for as long as a year the chances of a remission must be balanced against those that an intracranial hæmorrhage may occur. It is difficult to get figures for such a catastrophe, but the risk is probably not greater than that inherent in splenectomy itself, whilst the longer the condition grumbles on obviously the greater is the chance of a serious or fatal episode.

Most observers agree that the spleen is as likely to be impalpable as palpable in idiopathic thrombocytopenic purpura. I do not consider that the family history of pernicious anæmia is likely to influence the development or outcome of the disease.

I. A. B. CATHIE, M.D., M.R.C.P.

PRACTICAL NOTES

Piperazine for Threadworms

PIPERAZINE, in the experience of M. H. Rachelson and W. R. Ferguson (*American Journal of Diseases of Children*, March 1955, **89**, 346) 'has proved to be a satisfactory agent for the treatment of enterobiasis'. This conclusion is based upon the findings in a series of 150 cases, 138 of whom were children aged 10 months to 13 years. The drug was given as 'an orange-flavoured syrup containing piperazine citrate in an amount equivalent to 100 mg. piperazine hexahydrate' per ml. (500 mg. per teaspoon). It was given for seven consecutive days, followed by a rest period of one week, and then a second course of treatment for seven days. The dosage schedule was: 250 mg. daily for children up to 15 lb. (6.8 kg.) body weight; 250 mg. twice daily for children weighing 15 to 30 lb. (6.8 to 13.6 kg.); 500 mg. twice daily for children weighing 30 to 60 lb. (13.6 to 27.2 kg.); and 1000 mg. twice daily for children over 60 lb. (27.2 kg.) and for adults. At the end of three weeks (i.e., after the second course of piperazine) ova were found on perianal swabs in only 16 cases: i.e., a cure rate of 89.3%. Twelve of the patients with persistent infestation were given a further week's course of treatment, and at the end of this time all yielded negative swabs. Thus, the over-all cure rate was 97.3%. Side-effects, which were all mild, were encountered in seven patients: four had urticaria, one had erythema multiforme, one had diarrhœa, and one had nausea. Emphasis is laid upon the fact that the administration of piperazine was accompanied by the usual hygienic measures,

such as careful scrubbing of the hands and nails, the wearing of cotton pants at night, the discouragement of finger sucking, and so forth.

'Furadantin' in Urinary-Tract Infections in Children

SATISFACTORY results are reported by S. Harris Johnson and M. Marshall Jr. (*American Journal of Diseases of Children*, February 1955, **89**, 199) from the use of 'furadantin' in the treatment of infections of the urinary tract in children. The recommended daily dosage is 10 mg. per kg. body weight, given in four divided doses by mouth, for several weeks. In the 18 children with no anatomical abnormality of the urinary tract, sterilization of the urine was obtained in 11, and another two showed symptomatic improvement. In the 11 cases in which sterilization of the urine was obtained, the infecting organisms were *Proteus vulgaris* in four, *E. coli* in five, *Pseudomonas* and *Proteus vulgaris* in one, and *E. coli* and a streptococcus in one. *Proteus vulgaris* was the predominant organism in eight cases, and in only two of these were the results unsatisfactory. The authors comment that 'furadantin' 'has been much more effective than any other drug' they have used previously in the treatment of such infections. The results were not so satisfactory in the 11 cases associated with an anatomical abnormality of the tract, but 'furadantin' was of value in controlling acute exacerbations in several of these cases. Apart from one child who developed a generalized urticaria and angioneurotic œdema after five weeks' treatment, no toxic effects were encountered.

Vitamin B_{12} and Growth in Children

IN a review of the available evidence on the use of vitamin B_{12} as a growth factor in children, J. A. Campbell and J. M. McLaughlan, of the Food and Drug Laboratories of the Department of National Health and Welfare, Ottawa, (*Canadian Medical Association Journal*, February 15, 1955, **72**, 259) conclude that the 'available evidence indicates that the effect is far from spectacular and that there is little, if any, justification for the widespread use of vitamin B_{12}'. Although retarded growth is an important criterion of vitamin B_{12} deficiency in chickens, 'no similar deficiency state has been demonstrated in man, and the nature of the effect of vitamin B_{12} on the growth of children has not been clearly defined'. Further, as Bethell has pointed out, 'although B_{12} is an essential nutrient, it appears that normal nutrition and blood cell production can be maintained in an almost complete absence of a dietary supply of the material. In such cases, where the diet has been lacking in foods of animal origin, the nutritional needs must, presumably, be met by intestinal bacterial synthesis of the vitamin'. In discussing the suggestion that vitamin B_{12} may stimulate the appetite and that weight gain might result from higher food consumption, attention is drawn to the fact that controlled experiments in adults have lent no support to this hypothesis.

Unexpected Death in Asthma

'THERE is a small number of asthmatic patients who die quite suddenly in an attack which does not differ in any respect from the attacks of asthma to which these patients are accustomed' and which is 'completely different' from status asthmaticus, according to James Maxwell (*Diseases of the Chest*, February 1955, **27**, 208). He gives details of nine such cases which he has seen during the last ten years. These cases had certain features in common. All were over 35 years of age, and only one was under 40. In only two cases was the duration of the asthma longer than two years. In only three was there any cardiac abnormality: one had an enlarged heart, one had hypertension and one had hypotension. The 'most significant feature', according to the author, was the 'depressive tendency' in each of them. In contrast to the cheerfulness with which most asthmatics face up to their handicap, in all nine in this series 'there was a defeatist attitude almost from the start, and in seven the patients expressed a conviction of impending death'. It is suggested that a guarded prognosis should be given in an asthmatic subject who exhibits a pessimistic attitude, and the question is raised as to whether electroconvulsive therapy might not be worth considering. As death in these cases is so sudden, there is no possible treatment unless the doctor happens to be present at the time, when the intravenous injection of 5 to 7 ml. of nikethamide is suggested.

Topical Tripelennamine in Cystoscopy

IN the opinion of F. G. Sheddan and P.-M. Belanger (*New England Journal of Medicine*, January 27, 1955, **252**, 141), '2% tripelennamine ['pyribenzamine'] solution compares very favourably with other topical anæsthetic agents used for urologic procedures'. They add: 'It is to be noted in particular that the excellent tolerance for this solution led us to employ it in the presence of urethral bleeding, a circumstance that had previously been considered a contra-indication to topical anæsthesia'. The method used was to instil 15 ml. of a 'sterile stock solu-

tion' (2%) five minutes before introduction of the cystoscope. The effect lasted for forty to sixty minutes, 'permitting ample time for examination'. In a series of 276 examinations in 266 patients, aged 14 to 84, the results were adjudged as 'good' (no complaints on instrumentation) in 160 cases (58%), 'fair' (slight pain or discomfort) in 84 (30%), and 'poor' in 32 (12%). The only side-effect noted was occasional slight burning on instillation of the solution; this passed off as the anæsthesia deepened.

Radioactive Gold in Malignant Effusions

DETAILS are given by I. I. Cowan and F. G. Karioris (*American Journal of Obstetrics and Gynecology*, February 1955, **69**, 312) of the results obtained from the use of radioactive colloidal gold (Au^{198}) in the treatment of pleural effusions and ascites associated with malignant tumours. In 10 cases of carcinoma of ovary the gold was given intrapertioneally as a prophylactic measure before ascites had developed. None of these patients developed ascites, and six of them lived six months or longer. In 24 cases, in which pleural effusions or ascites had developed, eight survived six months or longer and seven of these were 'palliated': i.e., either required no, or only one, tapping of the effusion. Only five of this entire group required a single additional aspiration. The authors comment that 'in the group of patients in whom the gold produced the desired effect, that is, inhibited the reaccumulation of fluid in the abdomen or chest, the general condition of the patient also showed considerable improvement'. The major toxic hazards of radioactive gold are leucopenia or aplastic anæmia. Neither occurred in this series.

Erythromycin in Trachoma

IN a small series of 21 children with trachoma, satisfactory results are reported by R. R. Button (*American Journal of Ophthalmology*, February 1955, **39**, 223) from the use of erythromycin administered orally in doses of 2 to 3 mg. per lb. (4.4 to 6.6. mg. per kg.) body weight, given at four- to six-hour intervals. No local medication was used. The results are described as 'quite startling with marked improvement in both the clinical signs of the disease and a fairly rapid return of the conjunctival sac to normal'. The time taken for reversion to normal cytology averaged 4.0 days in Stage I (4 cases), 4.9 days in Stage II (7 cases), and 5.7 days in Stage III (10 cases). At least twelve days' treatment is recommended. Ten of the cases had previously failed to respond to sulphonamides. During an eight-months' follow-up period there was no recurrence in any of the cases.

ACTH and Mustine in Cancer

'TEMPORARY remission of 16% and the successful palliation of an additional 15% of 100 patients with hopeless cancer' are reported by W. D. McCarthy (*New England Journal of Medicine*, March 24, 1955, **252**, 467) from the combined use of ACTH and nitrogen mustard (mustine). In only 40% of cases was no benefit at all obtained. In some cases, cortisone was used instead of ACTH, and in carcinoma of the breast and of the prostate it was found that cortisone was more effective than ACTH. Thus, of 15 cases of carcinoma of the breast who had had a radical mastectomy and had metastases, five treated with ACTH and mustine showed no response. On the other hand, of the ten treated with cortisone and mustine, seven 'received good palliation', and in one of these the remission still persisted sixteen months after treatment. It was found that the response of the patient to the initial course usually established its ultimate value. Clinical improvement usually occurred within three to six weeks. One of the practical advantages claimed for this combined therapy is that the simultaneous administration of ACTH (or cortisone) diminishes the toxic effects of mustine, such as nausea and vomiting. The dose of ACTH was 60 to 80 units intramuscularly every six hours, the first dose being given twelve to eighteen hours before the first dose of mustine. Mustine was given intravenously: 0.5 mg. per kg. body weight daily for five days. When cortisone was given, the dosage was 50 to 75 mg. four-hourly, either orally or intramuscularly. After the fifth dose of mustine, the dose of ACTH was gradually decreased and then stopped, but patients receiving cortisone were sent home on a daily oral maintenance dose of 100 to 200 mg. Those patients who showed a good response to the first course of treatment were given a second and a third course at monthly intervals.

Treatment of Brittle Nails

FOR the treatment of brittle nails, S. W. Rosenberg and K. Oster (*Connecticut State Medical Journal*, March, 1955, **19**, 171) recommend the oral administration of gelatin. They report their findings in a series of 36 cases, unselected except that cases of onychomycosis were excluded. The daily dosage of gelatin was 7 grammes, and patients were recommended to take this for fifteen weeks, this period being chosen as it represents the length of time a nail takes to grow to its full length. Patients were instructed to take the gelatin in water, fruit juice, or milk. Neither the use of nail polish nor strong household chemicals was discontinued, except in those cases in which eczematous

lesions of the hand were present. At the final evaluation, 26 cases 'showed much improvement in that splitting stopped and the nails could be manicured to a point after gelatin therapy', and one showed some improvement. The remaining nine were classified as failures: of these, three only took the gelatin for a month or less, three were diabetics and two had congenital or familial disease of the finger-nails. One of the patients who showed no improvement at the end of three months persisted in taking the gelatin and there was definite improvement at the end of five months. Of the 26 improved, 'the most striking improvement was in five psoriatics whose nails showed remarkable clearing though there was no perceptible influence on the lesions of the rest of the body'.

Heberden's Nodes

'IDIOPATHIC Heberden's nodes may occur without clinical evidence of other osteoarthritis', according to Robert M. Stecher (*Annals of the Rheumatic Diseases*, March 1955, **14**, 1). He does not believe that Heberden's nodes are a part of a generalized osteoarthritis syndrome. It is a hereditary condition, and there is also a definite association between the development of Heberden's nodes and the menopause. There is no effective therapy. Aspirin is a useful palliative during the period of development when the fingers are sensitive and may be painful. Stecher's policy is 'to tell patients that they have a hereditary disease which comes on at the time of the menopause. Since they have chosen their parents ill-advisedly in this respect and since their menopause cannot be prevented, there is little likelihood of preventing their disease'. The appearance of Heberden's nodes causes distress because of the cosmetic effect and because of fear that they indicate the development of a crippling disease. Such is not the case, and the physician should reassure his patients on this point.

Liver Therapy in Stomatitis in Children

ACCORDING to W. E. Keiter and J. H. Arnold (*Archives of Pediatrics*, December 1954, **71**, 392), 'liver therapy is most helpful in infectious gingivostomatitis, Vincent's oropharyngitis and catarrhal stomatitis of the newborn. It shortens the duration of the infection and adds to the patient's comfort'. The recommended dosage in the case of the first two of these conditions is 1 to 2 ml. of crude liver extract every day. No local treatment is necessary. Details are given of 44 cases of infectious gingivostomatitis treated in this way. The number of daily injections required ranged from one to eleven, but in 37 cases the number of injections was five or less. Only one child required ten injections, and only one required eleven; both of these 'had been badly neglected before receiving treatment'. It is reported that 'invariably the earlier the children were brought for treatment the quicker the response'. In Vincent's oropharyngitis the membrane usually sloughed after one or two doses. For catarrhal stomatitis and glossitis of the newborn, usually one or two doses of 0.5 ml. intramuscularly gave 'a prompt cure'. Liver therapy is of no value in thrush.

Myoidema

MYOIDEMA is a physiological reaction, the duration of which is largely dependent upon skin and muscle thickness, according to M. P. Jones and W. E. Parkes (*Clinical Science*, 1955, **14**, 97). In a consecutive series of 50 patients they found that the phenomenon could be demonstrated only when the skin thickness was less than 7 mm. In all, the phenomenon was studied in 111 patients, and it was demonstrated that '85% of the myoidema reaction is explicable in terms of the skin, subcutaneous tissue and muscle thickness'. A study of the diagnoses of their patients 'indicated that no disease process gave consistent alterations in susceptibility to myoidema', and the conclusion is reached that, because of the wide variations in duration of myoidema, 'it seems unlikely that this can be made a useful physical sign'.

Golf Hands

'SEVERAL cases of painful, swollen, tender hands caused by the sufferers' gripping the golf club handle too tightly, too often, and without sufficient interruption' are reported by Philip Lewin (*Journal of the American Medical Association*, February 5, 1955, **157**, 533). It is said to occur chiefly in women 'who are going through or have completed, the menopause' and usually after the midseason of golf. The condition is characterized by pain, swelling, weakness and stiffness of the hands, especially in the morning. Spasm is common. X-rays may reveal osteoporosis. Treatment consists in increasing the thickness of the golf club handles with rubber wrappings and advising the patient to wear unfinished calf gloves; ordinary golf gloves are too thin. Other useful measures are to advise the patient to give up golf for a week, play only nine holes, and 'revise the club grip (the baseball grip is helpful for a while)'. In more serious cases, whirlpool baths and hot paraffin dips are useful, whilst ethyl chloride sprays may 'break the "pain and spasm" reflex'. As there is sometimes evidence of fluid retention in these cases, salt in the diet should be kept to a minimum.

REVIEWS OF BOOKS

British Obstetric and Gynæcological Practice. EDITED BY SIR EARDLEY HOLLAND, M.D., F.R.C.P., F.R.C.S., F.R.C.O.G., and ALECK BOURNE, M.B., F.R.C.S., F.R.C.O.G. London: William Heinemann Medical Books Ltd., 1955. Pp. xlvi and 2,007. Figures 758. Two volumes. Price £5 15s.

THE distinction of the editors and the 47 contributors, and the scope and content of these books make them an important contribution to the contemporary literature of obstetrics and gynæcology. The term 'Practice' is used to indicate a general survey of clinical practice today with only certain aspects of anatomy, physiology, and pathology being introduced. The labours of Hercules are proverbial. Those of editors should be so too! Sir Eardley Holland and Mr. Bourne are to be congratulated on filling the gap between the conventional textbook or encyclopædia on the one hand and books dealing with modern advances on the other. For this reason these volumes contain much that is well worthy of attention by the practitioner who is either specially interested in the subject or who desires to be aware of the changing framework within which his hospital and specialist colleagues are working.

The main approach is from the clinical and practical aspects. All the chapters can be read with interest and profit and cover in the main their subjects. The modern tendency of introducing material from allied and relevant fields has been followed, and thus the main clinical pattern has been supplemented by chapters on legal, psychological, statistical, and some scientific aspects. One naturally turns to those chapters concerned with the main clinical problems of today and finds very able expositions on, for example, carcinoma of the cervix by Blaikley, on difficult labour by Baird and Jeffcoate, and on stillbirth by Baird. Moir gives a lucid account of vesico-vaginal fistula from his considerable personal experience. The late McIntosh Marshall contributed a masterly account of the present role of Cæsarean section. There are also very adequate chapters on the problems which are met by those jointly concerned in the welfare of the newborn.

In books such as these by multiple authors one of necessity finds inequalities; a criticism foreseen by the editors. The irregularities are not so much of style or approach as of content and arrangement. For example, there is a separate chapter in each book on pelvic infection although the main content is necessarily the same. The sections on urinary complications overlap in several chapters. The psychological care of the pregnant woman is given a separate chapter quite apart from the reference to it in antenatal management. Other irregularities are shown in the space devoted to the anatomical and physiological sections. The study of placental function has been, and is, a characteristic of British physiology, but no chapter is included on this basic physiological aspect of obstetrics. The reviewer must confess that the typographic conventions employed to display and divide the various sections confused him. They did not seem consistent between chapter and chapter, volume and volume, or even in some instances within an individual chapter.

Modern Trends in Psychosomatic Medicine. EDITED BY DESMOND O'NEILL, M.C., M.D., M.R.C.P., D.P.M. London: Butterworth & Co. (Publishers) Ltd., 1955. Pp. xi and 386. Figures 29. Price 55s.

THIS book is a collection of essays on various aspects of psychosomatic medicine and the extent of the problem is outlined in the first chapter by Dr. Philip Hopkins, a general practitioner in Hampstead, who reports that some 40% of his patients are not suffering from organic disease. This, of course, is a higher proportion than occurs in hospital practice—in a general medical outpatient clinic about 10 to 20% of the patients referred are suffering from psychosomatic disorders. One of the major difficulties in arriving at an estimate of the frequency of these diseases is the lack of agreement as to what exactly is psychosomatic. Dr. Todd, a consulting physician, whose writings are always interesting and who contributes the most outstanding chapter in this book, is careful to warn against the mistaken belief that, because an unpleasant disease is associated with anxiety, the anxiety is necessarily the cause of the disease. Thus, he would not list, as Dr. Hopkins has done, angina pectoris, coronary thrombosis and diabetes mellitus as psychosomatic disorders. Many writers on this subject seem to consider themselves immune from the rules of evidence and logic which operate in other spheres of medicine where some attention is given to scientific controls and the use of statistics to establish correlations. Nowhere in the book is this attitude more apparent than in the chapter on 'Sexual adjustments and bodily illness', in which uterine fibroids, varicose veins and visceroptosis (a 'condition' which surely disappeared before the last war) are attributed to sexual maladjustment in early and later life.

Admittedly research in this field is difficult because methods developed for ordinary clinical investigation are often not applicable but, unless scientific methods are evolved, the psychosomatic disorders will remain a hazy, ill-defined and certainly ill-understood collection of clinical impressions and untenable beliefs: and Woolf and Woolff in New York have shown that such methods can be evolved. The frequency of these disorders makes it imperative that future doctors should learn something about them and Dr. Desmond O'Neill's chapter on 'Doctor, Patient and Student' points the way.

The reader will not find much in this book to help him to treat psychosomatic disorder except that by reading it he may change his own attitude of mind towards his psychoneurotic patients. This is of great importance to the general practitioner and also to the specialist who today is becoming increasingly less able to see the patient as a whole, is only concerned with the organ or region in which he specializes, and may adopt the view that emotionally caused somatic symptoms are no concern of his.

Poliomyelitis. By R. Debré and others. World Health Organization Monograph Series No. 26. London: H.M. Stationery Office, 1955. Pp. 408. Price 40*s*.

This publication contains thirteen chapters on the epidemiology, clinical aspects, virology, immunology and public health control of poliomyelitis by seventeen experts of international renown. Studies of the disease in undeveloped areas of the world have been of considerable significance in the development of modern views on epidemiology, and an interesting chapter on this subject is contributed by Dr. James Gear of Johannesburg. The section on clinical aspects contains two valuable chapters on the treatment of acute poliomyelitis by Dr. Ritchie Russell and Professor H. C. A. Lassen. Both are well illustrated and the subject matter is detailed and clear. Dr. John F. Enders, the Nobel Prize winner, contributes one of the three chapters on virology with a review of modern tissue culture methods. The section on immunology was written before the results of the clinical trials of the Salk vaccine were available, but gives comprehensive accounts of natural immunity, artificial active immunization with dead and living viruses and passive immunization. Finally there is a useful chapter on the public health aspects of the disease by Dr. A. M-M. Payne. One of the contributors expresses the hope that his article will be out of date in a few years time, but in spite of the Salk vaccine and other advances in the understanding and control of poliomyelitis it will be many years before this book is of historical interest only. Meanwhile it will prove of great value in providing the inexpert with a critical review and the expert with a work of reference. It is well produced and a credit to the World Health Organization.

Diabetes Mellitus. By Henry T. Ricketts, M.D. Springfield, Illinois: Charles C Thomas; Oxford: Blackwell Scientific Publications, 1955. Pp. viii and 123. Price 23*s*. 6*d*.

This small book starts with a brief but generally sound description of the objects of treatment; a good way of beginning even if one disagrees with the statement that the fat diabetic is a more serious problem than the thin. The difficulty of assessing control is rightly stressed, and the relationship between control and the incidence of complications is dealt with in a reasonably critical manner. The second part of the book deals with the treatment of uncomplicated diabetes, and the author wisely draws attention to some of the disadvantages of hospitalization in the stabilization of uncomplicated cases, in respect of both exercise and timing of meals. He rightly criticizes the fetish of the fasting blood sugar as a guide to diagnosis, and his statement that response to treatment is the only valid measure of severity should be written up in every pathological laboratory! The treatment of a typical case of moderate severity is well described, and due attention paid to maintenance therapy. The third part deals with acidosis and coma and, although generally sound, would be improved by some mention of the respective significance of the Rothera and Gerhardt tests for aceto-acetic acid. The last part is devoted to diets.

This book contains much wisdom, obviously derived from extensive experience, and is designed to meet the needs of the practising doctor rather than those of the student or specialist.

British Practice in Radiotherapy. Edited by Sir Ernest Rock Carling, F.R.C.P., F.R.C.S., F.F.R., B. W. Windeyer, M.B., D.Sc., F.R.C.S., F.R.A.C.S., F.F.R., and D. W. Smithers, M.D., F.R.C.P., F.F.R. London: Butterworth & Co. (Publishers) Ltd., 1955. Pp. xii and 549. Figures 142. Price 85*s*.

This book is not only completely new but also unique, in that it attempts to give a composite picture of British radiotherapeutic practice, the editors having called on the help of a large number of contributors whose work bears on this branch of medicine so that the undertaking

should be as representative as possible. In this way a great amount of information has been made available in comparatively small compass, whilst generous references to the literature make it possible to pursue the various subjects further. It is divided into two parts, the first dealing with general problems and methods in such a way as to lead up to the larger clinical section. The second part deals with treatment. In most of the sections a radiotherapist and a physician or surgeon collaborate in the presentation. All the usual tumour sites are dealt with and there is a special section on reticulosis and reticulosarcoma, followed by one on appropriate chemotherapy. Malignant disease in children is discussed and also an account of the use of radiotherapy in certain non-malignant conditions, which include some skin affections and gynæcological disorders. A special section on the treatment of thyrotoxicosis by radio-iodine supplements the information given in the general section on isotopes.

The advantages of having easy access to such a wide range of facts and opinions regarding radiotherapy are obvious and, though some readers may disagree regarding one point or another, the picture is a true and helpful one. The book should be of inestimable value to students of radiotherapy and of great interest to a much wider circle.

Reactions with Drug Therapy. By Henry L. Alexander, M.D. Philadelphia and London: W. B. Saunders Co., 1955. Pp. xii and 301. Figures 33. Price 52*s*. 6*d*.

This interesting and comprehensive volume includes a vast amount of accumulated information relating to those 'reactions' that may follow drug administration. The author, being himself primarily an allergist, has chosen to restrict the field so as to include within the scope of the title only those 'reactions' which he believes have a basis in true 'hypersensitivity' to the drug. This policy has led to the inclusion as reactions of a number of syndromes, such as aplastic anæmia, which might justifiably be regarded as toxic effects of the drugs, and, equally, to the exclusion of numerous conditions following drug administration which most physicians regard as 'reactions' to the drugs, in as much as they are untoward occurrences not related to the effect for which the drug is given therapeutically. For example, there is no mention of any possibility of gastric irritation or ulceration accompanying the use of phenylbutazone and no mention of gastric mucosal irritation or hypoprothrombinæmia as a reaction to aspirin. Few physicians would agree with the statement: 'Systemic manifestations of aspirin hypersensitivity are confined largely to bronchial asthma and anaphylactic shock'. Similarly, porphyrinuria is omitted from any consideration of the effects of sulphonamides and barbiturates, and goitre and hypothyroidism as a complication of para-aminosalicylic acid are not mentioned. British readers will find it strange to read with regard to methylthiouracil that 'little appears in the literature about this drug', an untrue statement that is unfair to the many authors who have reported upon the frequent development of sensitivity and other reactions following the use of this particular antithyroid compound.

Despite these imperfections, however, which are inevitable when the author restricts his terms of reference to allergic responses, the volume is of considerable value, and the sections which deal fully with the more commonly encountered hypersensitivity reactions are excellent. A discussion and review of the literature concerning penicillin is very good and puts the whole subject into proper perspective. The bibliography attached to each section is full and covers published accounts up to 1953. This book can be thoroughly recommended to dermatologists and allergists in particular, as providing important information about many of the reactions which they will see. The general physician will nevertheless wish that some other 'reactions' had been covered by the author.

The Civilian Health and Medical Services. Vol. II. Edited by Sir Arthur S. MacNalty, K.C.B., M.D., F.R.C.P., F.R.C.S. London: H.M. Stationery Office, 1955. Pp. xi and 406. Price 45*s*.

This volume of the 'Medical History of the Second World War' deals with the Colonies, the medical services of the Ministry of Pensions, Scotland and Northern Ireland. The colonies included in this survey are Malta, Hong Kong, Malaya, Northern Borneo, British Somaliland, Palestine, Cyprus, Gibraltar and Ceylon. To many readers this section will be the most interesting, particularly the sections dealing with Malta, Hong Kong and Malaya. No fresh light is thrown on the tragedy of the latter two, but it is useful to have this coordinated picture of the medical aspects of these two colonies during their all too short period of fighting and their grim years of enemy occupation. Reticence is the keynote of this volume, but occasionally, as in the two following quotations, the official mask is dropped for a moment: 'From the civilian medical point of view most of the minor contingencies of the Malayan campaign were foreseen, and the arrangements made to deal with them were effective. The major risks of retreat, defeat and surrender were apparently never foreseen. If they were, plans based on these

possibilities were never passed down to civilian medical levels'. 'The most important direct effect of the war on the health of the people [of British Somaliland] was the marked increase in prostitution and venereal disease. This was perhaps inevitable, when it is considered that large numbers of alien native troops employed by the Italians and by ourselves were quartered in the country for practically the whole duration of the war. This was one of the many social evils caused by the war, and one which will have a profound effect on the health of the Somalis for many years to come'.

Dental and Oral X-Ray Diagnosis. By A. C. W. HUTCHINSON, D.D.S., F.D.S. Edinburgh: E. & S. Livingstone Ltd., 1954. Pp. xii and 524. Illustrations 946. Price 75*s*.

THE need for a comprehensive work on dental and oral radiology has long been felt. Certainly there are already books on the subject, but most, if not all, have attempted to deal with dental radiological interpretation in isolation, that is to say, without considering the clinical features, etiology and pathology of the conditions under discussion. Professor Hutchinson has rightly and successfully avoided this mistake and in doing so has produced a valuable work, which is something more than one on x-ray interpretation. He clearly portrays the relationship of the radiological to the clinical and other diagnostic findings in their true perspective, which will render not only a valuable service to dental students and practitioners alike, but will also be of particular assistance to the general radiologist untrained in the niceties of dental anatomy and oral pathology and yet who must, in the absence of a dental radiologist, from time to time express opinions on radiographs of oral conditions. There is more in this book than the undergraduate dental student requires, but it is one he should possess and cherish and in later life keep in his surgery for frequent reference.

NEW EDITIONS

Diseases of Infancy and Childhood, by Wilfrid Sheldon, C.V.O., M.D., F.R.C.P., in its seventh edition (J. & A. Churchill Ltd., 50*s*.) has been revised with commendable care. New sections include those dealing with retrolental fibroplasia, galactosuria, and endocardial fibro-elastosis, whilst the sections on rickets, prematurity, infant feeding, and the management of cœliac disease, amongst others, have been rewritten. In view of the otherwise careful pruning, it is difficult to understand why so much space is still devoted to the details of the administration of arsenic in the treatment of congenital syphilis. One of the reasons for the well-deserved popularity of this textbook has always been the attention given to practical details, but it is surprising to find 'liquid extract of salix nigra, a drug which is used as a sexual sedative' recommended for the treatment of masturbation. And is it really the case that in dealing with tuberculous glands in the neck, 'treatment should begin with the removal of tonsils and adenoids'? Many dermatologists will not appreciate the reference to the use of penicillin cream in the treatment of impetigo contagiosa.

This, however, is a book which has stood the test of time and which has the great advantage of one-man authorship. In many ways it is the ideal textbook of pædiatrics for the student.

Midwifery, by Ten Teachers, in its ninth edition (Edward Arnold (Publishers) Ltd., 32*s*. 6*d*) maintains the high standards of its predecessors as the quintessence of the obstetric practice of the London Teaching Hospitals. The editors of the new edition are Frederick W. Roques, John Beattie and Joseph Wrigley. A new departure in this edition is the inclusion in the team of contributors of a pædiatrician, Dr. E. W. Hart of the Middlesex Hospital, who contributes three chapters dealing respectively with the care of the new-born infant, infant feeding, and diseases and injuries of the new-born child. This book has the great advantage that its primary aim has always been to cater for the medical student and the young practitioner. The resultant emphasis on practice and orthodoxy, with the eschewing of theory, combined with the unusual degree of coordination of the views of the contributors, makes it the ideal book for the learner. Conservatism may occasionally be carried too far, as in the section on the treatment of syphilis in the pregnant woman, but this is an error on the right side.

Peripheral Vascular Diseases, by E. V. ALLEN, M.D., N. W. Barker, M.D., and E. A. Hines, Jr., M.D., in its second edition (W. B. Saunders Co., 91*s*.) remains the most useful survey of the subject for the clinician. The term, 'peripheral vascular diseases', is interpreted in a wide sense and is taken to include diseases of the lymphatic system, coarctation of the aorta and purpura, as well as the more commonly recognized diseases of the arteries and veins. The book is a typical product of the Mayo Clinic—comprehensive, authoritative and thorough. The illustrations, particularly the microphotographs, are of a commendably high standard. There is a wealth of information in this book. Surgeons, as well as physicians and practitioners, will find it of outstanding value in the diagnosis and treatment of this complex group of diseases.

Bedside Diagnosis, by Charles Seward, M.D., F.R.C.P.ED., third edition (E. & S. Livingstone Ltd., price 18*s.* 6*d.*).—A surgical colleague stated that the title of this book implied that physicians nowadays seldom made their diagnoses at the bedside. If this were true it would hardly be expected that a third edition of this excellent book would have been called for within six years. The general layout remains the same, with Dr. Seward discussing the common presenting symptoms of disease both of the body and of the mind. Among the sections that have been rewritten are those on fibrositis, cholecystitis and hiatus hernia and there is also a chapter on normal values in various biochemical examinations. The number of pages has, however, been only slightly increased and the brevity and compactness are, in the opinion of the reviewer, a most desirable feature of a book which is essentially one for quick reference. Dr. Seward has succeeded admirably in his main purpose: to write a book which preserves the traditional approach of the best British medicine.

Cardiac Symptoms in the Neuroses, by Doris M. Baker, M.D., F.R.C.P., in its second edition (H. K. Lewis & Co. Ltd., 6*s.* 6*d.*) remains one of the soundest little books on the subject. The author presents a straightforward simple account of the subject which will appeal to the clinician who wants to have the facts rather than the theories. Unnecessary cardiac invalidism is not the problem it was, but the triad of left inframammary pain, sighing respiration, and palpitations can still provide many a diagnostic problem for the practitioner. It is in the elucidation of these cases that he will find this book of value.

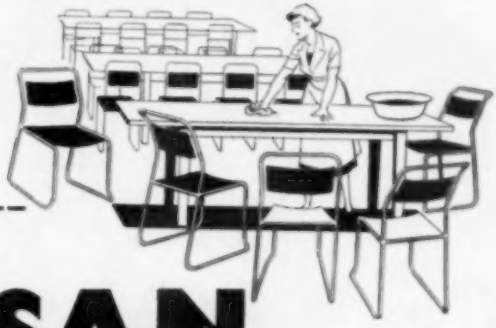
Local Analgesia: Brachial Plexus, by R. R. Macintosh, D.M., F.R.C.S.ED., F.F.A.R.C.S., D.A., and W. W. Mushin, M.B., F.F.A.R.C.S., D.A., twelfth edition (E. & S. Livingstone, Ltd., 10*s.* 6*d.*).—There is still a place for local analgesia, and this little picture-book is designed to give the beginner all the confidence that comes from watching a technique performed by a master, rather than by reading a text about it. In this respect authors and artist have succeeded admirably. Those working single-handed in remote places will find the book particularly useful as a guide to safe practical analgesia when treating injuries of the hand and arm. The complications are fully listed, but more emphasis might have been laid on the danger of sepsis, which is dismissed somewhat light-heartedly.

Developmental Anatomy, by Prof. L. B. Arey, PH.D., SC.D., LL.D., sixth edition (W. B. Saunders Co., 47*s.* 6*d.*).—Since this book first appeared 30 years ago it has gained a high reputation, and this edition will maintain and enhance its credit. The revision has been thorough, many new figures have been added, and by textual rearrangements and typographical improvements the subject matter has been simplified and clarified. The claim is made that 'the basic information for which all students, college or medical, might reasonably be held accountable' is printed in large type—and the major part of this largish book is in this type. Few medical teachers will agree with this claim, as many of the details given are not basic. On the other hand, from the medical viewpoint, certain topics dealt with briefly and in smaller type, such as facial, cardiac, alimentary, urogenital and other anomalies, might well have received more attention; and it seems strange that in a book entitled 'Developmental Anatomy' the story stops at birth and practically nothing is said of the many important post-natal developments. With these admittedly medical reservations, this book provides an admirable, authoritative and up-to-date review of embryology.

Textbook of Biochemistry, by E. S. West, PH.D., and W. R. Todd, PH.D. (The Macmillan Co., price 63*s.*).—The authors are to be congratulated on this well-balanced second edition of their textbook. The arrangement follows the conventional lines in that the first part deals with physical and organic chemistry in their application to biochemistry, whilst the remainder deals mainly with biochemistry as related essentially to medicine. The various chapters on water-balance, acid-base equilibrium, metabolism and so on are authoritatively written with full, up-to-date references, to both general and specialized literature on the various subjects. Many of the chapters, such as those on carbohydrate and proteins, have been largely rewritten since the first edition, and many others, such as those on enzymes and metabolism, have been brought up to date in keeping with rapid advances in these fields.

The book runs to over 1,300 pages and is much too full for the student to cope with in an overburdened medical curriculum but the subject-matter is so arranged that it could well be used with any medical course in biochemistry. For the science student taking more advanced biochemistry it is, in the reviewer's opinion, an ideal textbook, if only from the point of view of the amount of experimental evidence offered in the text, and the extensive references, both of which should do much to help to stimulate further specialized study.

Notes and Preparations, see page 753
Fifty Years Ago, see page 757



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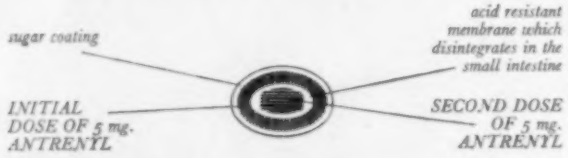
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NOTES AND PREPARATIONS

NEW PREPARATIONS

APERIGRAN' aperient granules contain 30% sterculia B.P.C., 10% cocoa, 55% sucrose, 5% liquid extract of malt. They are intended for the treatment of constipation and of dyschezia. Available in bottles containing 4 ounces and in tins containing 5 lb. (Fletcher, Fletcher & & Co., Ltd., Vibrona Laboratories, Holloway, London, N.7.)

'BIDORMAL' tablets each contain 90 mg. of pentobarbitone sodium B.P., 'in a rapidly soluble outer shell', and 60 mg. of butobarbitone B.P., 'in an enteric-coated inner core', and are intended for the treatment of insomnia. One tablet is said to provide 'evenly maintained sedation' for approximately eight hours. Supplied in bottles of 25 and 500. (Allen & Hanburys Ltd., London, E.2.)

'DAPRISAL' is described as a 'general analgesic for routine use' which 'attacks not only the pain itself but also the accompanying apprehension and depression'. Each tablet contains 32 mg. of amylobarbitone, 5 mg. of dexamphetamine sulphate, 160 mg. of acetylsalicylic acid, and 160 mg. of phenacetin. Supplied in bottles of 50 and 500. (Menley & James Ltd., Coldharbour Lane, London, S.E.5.)

'HYPAQUE' (a 45% aqueous solution of sodium diacetoamido tri-iodobenzoate, containing 60% iodine, and disodium calcium ethylenediamine tetra-acetate [1:10,000] as a stabilizer) is a new radiopaque medium for intravenous excretion urography. It is said to be 'half as toxic as diodone' and to give 'an exceptionally high degree of contrast'. Supplied in boxes of 5 x 20-ml. ampoules. (Bayer Products Ltd., Neville House, Eden Street, Kingston-on-Thames, Surrey.)

'KAOMYCIN' (colloidal kaolin with neomycin) is intended for the treatment of infectious diarrhœas. Each fluid ounce contains 300 mg. of neomycin sulphate (equivalent to 210 mg. of neomycin base) and 5.832 g. of kaolin, suspended with methylcellulose. Supplied in bottles of 4 and 16 fluid ounces. (Upjohn of England Ltd., 4 Aldford Street, Park Lane, London, W.1.)

'NIDAR' tablets each contain 24 mg. of secobarbitone sodium, 24 mg. of pentobarbitone sodium, 8 mg. of butobarbitone sodium and 8 mg. of phenobarbitone. They are intended for use in the treatment of nervous tension and as a hypnotic. The action of one tablet is said to persist for four to five hours. (Armour Laboratories, Hampden Park, Eastbourne, Sussex.)

'SEOMINAL' tablets each contain 10 mg. of phenobarbitone, 300 mg. of theobromine and 0.2 mg. of reserpine. They are said to be 'primarily indicated in mild and moderate hypertension', but 'may also be tried in severe hypertension before recourse is made to more powerful hypotensive agents'. Supplied in bottles of 100 and 500. (Bayer Products Ltd., Neville House, Eden Street, Kingston-on-Thames, Surrey.)

PHARMACEUTICAL NOTES

ABBOTT LABORATORIES LTD. announce that their preparation 'di-paralene' (chlorcyclizine hydrochloride, Abbott) is now available in bottles of 25, 100 and 500 'filmtabs'. 'Filmtab' is 'a special film coating' which 'masks the bitter taste of chlorcyclizine'. (3 Wadsworth Road, Perivale, Greenford, Middlesex.)

BAYER PRODUCTS LTD. announce that they are now producing a preparation which combines their nasal decongestant, 'neophryn', with thenyldiamine hydrochloride ('a new antihistamine'). This will be known as '"neophryn" with antihistamine', and is intended for the treatment of allergic rhinitis (including hay fever). Available as a 0.5% solution in a plastic atomizer. (Neville House, Eden Street, Kingston-on-Thames, Surrey.)

RIKER LABORATORIES LTD. announce that 'calcium disodium versenate' (see *The Practitioner*, November 1954, p. 633) is now also available in 0.5 g. tablets, in bottles of 100 and 500. (Morley Street, Loughborough, Leicestershire.)

FILM NEWS

Childbirth Without Fear (16 mm., colour, commentary, running time 20 minutes). In this film Dr. Grantly Dick Read shows the results of previous instruction regarding relaxation, breathing and so on in four unselected cases. Available to hospitals, nurses' training schools and antenatal clinics, at a fee of three guineas for each screening. Arrangements may be made for 'permanent loan' at charges to be agreed. (G.B. Equipments Limited, Film Division, Aintree Road, Perivale, Greenford, Middlesex.)

FORTHCOMING CONFERENCES

The Third International Vitamin-E Congress is to be held in Venice on September 5-8, 1955. Full details can be obtained from the secretary: Professor Emilio Raverdino, Via Pietro Verri 4, Milan.

The Second World Congress of the International Fertility Association is to be held in Naples on May 18-26, 1956. Further details can be obtained from the president of the arrangements committee: Professor G. Tesauro, S. Andrea delle Dame 19, Naples.

SECONDARY SCHOOLS FOR SPASTICS

THE first two secondary schools for spastic children in Great Britain have just been opened by the National Spastics Society. One of these —the Thomas Delarue School—is at Dene Park, Tonbridge, Kent. Eighteen children have been admitted this term, and it is hoped eventually to accommodate 45 boys and girls. Education up to General Certificate level, combined with treatment, will be provided. The second, at Craig-y-Parc, Cardiff, has opened with 12 children, aged 5 to 16, but it is hoped that facilities will eventually be available for 35. During this year the Society aims at opening five special schools. (National Spastics Society, 28 Fitzroy Square, London, W.1.)

THE G.P. AND THE HOSPITAL IN SCOTLAND

IN a paper read before a health services conference at Peebles on April 1, Sir Humphrey Broun Lindsay, chairman of the South Eastern Regional Hospital Board commented that 'it is unfortunately true that one result of the development of the specialist services has been to deprive general practitioners in some areas of the opportunities they enjoyed before the establishment of the Health Service for looking after their patients in the local hospital'. He expressed the view that 'there must be no iron curtain between general practice and the hospital service, and the need for economy—no less than the interests of the patient—makes it vital that there should be the fullest partnership between these two branches of the Service. It is a waste of the general practitioner's training if he is deprived of the chance to exercise the full range of his skill, and it is no less a waste of the specialist services if they are required to do what could be done as well, or better, by the general practitioner . . . Last August the Department of Health recommended a procedure for making dual appointments to general practice and the hospital service, and, the machinery being thus provided, we must see that the will to use it is made effective'.

NEW HEALTH CENTRE IN SCOTLAND

THE Stranraer Health Centre, the second to be built in Scotland and the first to be built adjoining or connected to an existing hospital, was opened on May 6. The aim of the Centre, which is experimental, is to bring the different health services closer together, and to enable them to cooperate to the advantage of the patient in the common aim of preventing as well as curing ill health. The building, which covers a total area of 7000 square feet, is built in an L-shape and incorporates an extension to the adjoining Garrick Hospital. One wing provides five consulting suites for the five family doctors who practise in Stranraer, and who between them have a total of 13,200 N.H.S. patients. In the other wing the local health authority has three rooms and a dental workshop for their own use, and will share another four with the hospital board of management who are responsible for the running of the Garrick Hospital. In addition, the hospital has for its own use a changing room, a plaster room and a suite of rooms for the x-ray unit. The Centre has cost £33,000.

SALE OF SEX HORMONES

SOME time ago the British Medical Association approached the Pharmaceutical Society to discuss whether any control should be imposed upon the distribution of sex hormones. After a full review of the problem the Council of the Society has decided to advise pharmacists not to supply sex hormones or their preparations unless satisfied that the customer is obtaining them on medical advice, though not necessarily presenting a prescription. This does not apply to cosmetic preparations containing hormones which are at present the subject of separate consideration. The Council has also approached the Poisons Board and asked that the Board should consider the position.

THE WORLD DISTRIBUTION OF POLIOMYELITIS

IN a review of the world incidence of poliomyelitis in 1953, M.-J. Freyche and his colleagues of the WHO (*Bull. Wld Hlth Org.*, 1955, **12**, 595) report a rise in the incidence of the disease in many parts of Africa, including French Equatorial Africa, Tanganyika and the Union of South Africa. In America, Canada experienced the worst poliomyelitis epidemic in its history—8,734 cases, which represents an increase of 84% over the 1952 figures which constituted the previous record. The 35,592 cases in the United States (22 per 100,000 inhabitants) represented a decrease of 39% compared with 1952. In Europe, Sweden had the most serious outbreak ever recorded there:

CONTINUED ON PAGE 755

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5,090 cases, which is ten times as many cases as in 1952. In England and Wales there were 5,250 cases. In Australia there were 1,719 cases, compared with 1,743 in 1952. So far as the virus is concerned, the available evidence indicates that all three types are widely distributed and that antibodies are required to all three types at about the same rate.

PHARMACEUTICAL PRODUCTIVITY

According to the annual report of the Association of British Pharmaceutical Industry, the industry's annual output in 1954-55 amounted to £120 million, made up as follows:—

	£ million
National Health Service	37.4
Exports	33.6
Proprietary medicines advertised to the public	34.0
Veterinary medicines and household remedies	15.0

The figure of £37.4 million represents 7.3% of the gross expenditure on the National Health Service, and was distributed as follows:—

	£ million
Hospitals	9.0
Retail pharmacists	27.6
Doctors	0.8

An analysis of the total ingredient cost of drugs and appliances supplied through retail pharmacists shows that this totalled £30 million, of which 58% was for proprietary drugs, 34% for unbranded standard drugs, and 8% for appliances (e.g. dressings, surgical hosiery).

DEATH IN THE HOME

During the last ten years, 57,413 people, including approximately 10,000 children under the age of five years, have died as a direct result of a home accident, according to A. C. Boucher (*Monthly Bull. Minist. Hlth*, 1955, **14**, 49). Of the 5,895 fatalities from this cause in 1953, 12% occurred in children aged 0-4 years, and 69% in people aged 65 years and over. In children between the ages of one and four years a fatal home accident is the third largest cause of death, and it is considered that the peak period of risk is during the third year of life. The most frequent types of fatal home accidents are: falls (60%), burns and scalds (10%), coal gas poisoning (10%), suffocation (9%), poisoning (3%). Of recent years there has been an increasing number of fatalities in old people, an increasing number of deaths from falls, coal gas poisoning and other poisoning, and a decrease in the number of deaths from suffocation and scalds.

IT'S NEVER TOO LATE TO WED

The Registrar General's 'Statistical Review' for 1953 shows that in 1953 there were 250 marriages where the bridegroom was aged 80 or over, and in six cases he was 90 or over. There were 47 marriages where the bride was between 80 and 86 years of age. This is out of a total number of marriages for the year of 344,998. The most common age for marriage continued to be 23 for men and 21 for women. The most popular months for marriage were March with 56,840 and August with 38,255. The least popular month was November with 15,475 marriages.

RABIES IN INDIA

The recently published annual report for 1953 of the director of the Pasteur Institute of Southern India, which is situated at Coonor in Madras State, shows that no deaths occurred among the 299 patients treated with antirabic vaccine at the Institute during the year. Since the Institute was founded in 1907, 42,933 patients have been treated for rabies at the Institute; of these, 411 subsequently died of the disease, giving a mortality rate of 0.96%. Fourteen deaths occurred among the 17,252 patients treated with antirabic vaccine at subsidiary centres during the year, giving a mortality rate of 0.08%. All these 14 deaths occurred among Asiatic patients: 11 deaths followed dog bites, two followed jackal bites, and one followed a cat bite. Since these subsidiary centres were set up in 1922, 315,382 patients have been treated at them for rabies, of whom 860 died—a mortality rate of 0.28%.

LAUDER BRUNTON AND THE COLORADO GOLD RUSH

The Library of St. Bartholomew's Hospital Medical School has just been presented with a copy of the edition of Sir Lauder Brunton's 'Lectures on the action of medicines' published in New York in 1899 (*St. Bart's Hosp. J.*, 1955, **59**, 64). It was discovered last summer in a 'ramshackle old log cabin' near Farncomb Hill, which lies amid the high mountains of Colorado. At the turn of the century Farncomb Hill was the largest gold mine in the area: 'now it is a ghost town' with only 200 inhabitants, mostly summer visitors. The mine was closed in 1902, so the book has lain for fifty-two years at an altitude of 11,500 feet where the snow lies from early September to late May, and where 40° below zero is quite usual. In spite of this it is still quite readable. The American who discovered it writes: 'As I picked it up and saw what it was, I dreamt of who and what the lad was who left it there, and what became of him. Was he a young medical student who came out from England to the mines; a practitioner who followed his profession in that rough country; a

lad who hoped to become a doctor some day; or what? There was lots of British capital invested in mining in Colorado, and the famous old North London and South London mines were only a few miles away'.

PUBLICATIONS

Therapeutic Index by C. M. Miller, M.D., M.R.C.P., and B. K. Ellenbogen, M.D., M.R.C.P., is designed as a supplement to the larger text-books, and summarizes in a most satisfactory manner the treatment of many of the common, and a few of the unusual, conditions encountered in hospital and general practice. The treatment outlined is standard and accepted treatment and the authors are to be congratulated on the selection of their material and the way in which their treatment has been summarized and yet kept up to date. In particular, the references to cortisone and ACTH have been confined to those conditions in which they have been found to be of proven value, and there are excellent dosage tables for the new antibiotics. There are some useful hints on practical procedures, a few simple common-sense diets and some useful tables. It is an index in handy, pocket-book form, which should meet with general approval from medical practitioners and resident medical officers. (Baillière, Tindall & Cox, price 12*s.* 6*d.*)

The Effect of Sugar Supplements on Dental Caries in Children (Medical Research Council Special Report Series No. 288), by J. D. King, May Mellanby, H. H. Stones and H. N. Green, is the report of an investigation into the effect of dietary supplements of sugar on the incidence of caries in children in residential homes. The results of the investigation show that, under the conditions of the investigation, the increased consumption of sugar had no significant effect upon the development of dental caries during the period of observation. As the authors point out, the investigation cannot be said to prove that sugar, however distributed and however eaten, will never affect the teeth, but 'it certainly points to the practical conclusion that, provided a child is fed on a diet as good as that of the average children's residential institution in England, a substantial increase in the amount of sugar in the diet will not affect the child's liability to dental caries within a period of at least two years'. (H.M. Stationery Office, price 4*s.*)

Alexander The Great and His Time, by Agnes Savill, M.D., F.R.C.P.I., is a notable contribution in more than one way. It is published just sixty years after the author graduated in the Faculty of Arts in St. Andrews' University. In the intervening six decades she has achieved fame in her chosen profession of medicine as joint-author of one of the best-known textbooks of medicine in the country, and as a dermatologist. This latest of her publications shows her in an entirely fresh light—a shrewd student of one of the greatest figures in the history of the world. Alexander the Great, an almost mythical figure, has probably been more maligned by certain historians than any other great historical personage. In this book Dr. Savill reviews the available evidence, and has little difficulty in showing that practically all the calumnies are without foundation. Her account of his famous eleven-years' campaign which took him as far as India and covered over 21,000 miles is a masterly effort. There is no better introduction to the study of this fascinating genius, whose ideas were so far in advance of his time. (Rockliff Publishing Corporation, price 25*s.*)

Our Children's Feet is a carefully prepared and illustrated leaflet outlining for mothers the elementary principles of the care of the feet of their children. Practitioners will find it of value and can recommend it with confidence to the mothers of infants and young children. (Central Council for Health Education, price 6*d.*)

From Spoonfeeding to Family Meals, intended as a guide for young mothers, deals briefly and simply with infant feeding from the first introduction of solid foods to the time when the child comes on to a full mixed diet. The booklet can be obtained free of charge from Trufood Ltd., Green Bank, London, E.1.

Clinical Trials by General Practitioners is a report on a preliminary investigation carried out in order to gain experience in the organizing of clinical trials by general practitioners. It will be read with interest by all general practitioners who are considering the possibility of carrying out such trials in their own practice. (Bismuth Research Department, Mining & Chemical Products Ltd., 86 Strand, London, W.C.2.)

INDEX AND BINDING CASES

The index to Vol. 174 (January—June, 1955) will be forwarded to all subscribers with the July 1955 issue. Binding cases for this and previous volumes are available in green cloth with gilt lettering, price 5*s.* each, post free. The cases are made to hold 6 copies after the advertisement pages have been removed; they are not self-binding. Alternatively, subscribers' copies can be bound at an inclusive charge of 12*s.* 6*d.* per volume; this includes the cost of the binding case and return postage.

The contents of the July issue which will contain a symposium on 'Diet and Nutrition', will be found on page xcvi at the end of the advertisement section.

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THE PRACTITIONER

Fifty Years Ago

'Beside 'tis known he could speak Greek
As naturally as pigs squeak;
That Latin was no more difficile
Than to a blackbird 'tis to whistle.'
Samuel Butler: *Hudibras*

JUNE 1905

'IN a trial which excited a good deal of interest about a year ago, the Lord Chief Justice (according to 'Notes by the Way'), as an *obiter dictum*, laid it down that "all doctors' Latin is bad Latin". He went on to ask a medical witness if he really suggested that doctors' Latin is classical, to which the witness, a Scotchman [sic], cautiously replied "some of it". There are, of course, doctors who can write and speak Latin that would not have sounded *pingue* or *peregrinum* to the ears of Tully . . . But "doctors' Latin" is not at all the same thing as the Latin of doctors who happen to be scholars. The Latin of prescriptions, which is "doctors' Latin" in the technical sense, is not, and cannot be, classical, for it has to express things unknown to the ancients. Notwithstanding this, it might be grammatically correct; but the fact is that comparatively few practitioners could write out an ordinary prescription in full without one or more blunders which reveal abysmal ignorance—or let us salve our professional pride by saying, disregard—of the most elementary rules of Latin accidence and syntax. We have seen *per orem* in one of our leading medical journals, and *coxum varum* in the other. In comparison with such monstrosities what is a slight confusion between the genitive and the accusative'? This editorial comment was prompted by 'a remonstrance addressed to us by a friendly critic as to the use of the genitive in the last line of prescriptions, *e.g.* infus*i* calumb*ae* ad ℥i'.

On the subject of 'Finger-prints and the Detection of Criminals', the Editor comments that the finger-print test of identity 'is sure enough for practical purposes, provided it is rightly used and the impressions are correctly interpreted. This, however, is not always an easy task, and not seldom it requires a special knowledge and an analytical skill that can be acquired only by a few, and by them only after a long course of training . . . the theory of Scotland Yard seems to be that of the eternal prototype of the policeman in regard to reading and writing. Our modern Dogberry acts as if he believed that the interpretation of finger-prints comes by nature. Deeming the assistance of a properly trained expert unnecessary, he deals with obscure finger-prints as trenchantly as a higher critic disposes of inconvenient texts in the Bible. . . . If we are to be hanged by the markings of our finger tips, at any rate let us have the melancholy satisfaction of knowing that the decipherment has been made *secundum artem*, and that we are not the victims of the blunderings of Policeman X'.

The first of the 'Original Communications', 'On Breathlessness, especially in Relation to Cardiac Disease', is by Sir Lauder Brunton,

James Sherren, C.B.E., F.R.C.S.
(1872-1945)

M.D., F.R.S., Consulting Physician to St. Bartholomew's Hospital. Writing on 'Cirrhosis of the Liver', Robert Saundby, M.D., F.R.C.P., Senior Physician to the Hospital, and Professor of Medicine in the University of Birmingham, reports the case of a 'moderate' drinker, who took on an average six glasses of ale and six of whisky daily. Raymond Crawfurd, M.D., F.R.C.P., Physician to the Royal Free Hospital; Senior Assistant Physician to King's College Hospital, discusses 'Valvular Disease of the Heart. I.—Mitral Stenosis', which ends on a note of false prophecy:—'The suggested enlargement of the orifice by tenotomy will never

find a place in practical therapeutics. The operation may be feasible on the normal heart of the human cadaver or of the living cat, but, if essayed on the rigid and often calcareous structures of mitral stenosis, will not only produce no appreciable enlargement, but will also tend to set free loose fragments into the systemic circulation'.

J. W. Thomson Walker, M.B., F.R.C.S., Assistant Surgeon to the North-West London Hospital, and to St. Peter's Hospital for Stone and other Urinary Diseases, contributes an article entitled 'The Separation of the Urine of each Kidney', in which he discusses recent methods of diagnosis in urinary surgery. Sir John William Thomson-Walker (1871-1937)—he hyphened his name in 1922, when he received a knighthood—graduated M.B., C.M. at Edinburgh in 1894 and under the inspiration of Otto Zuckerkandl of Vienna became interested in urology, which was to be his lifelong specialty. In 1919 he was elected senior urologist at King's College Hospital. A man of wide culture, he was an enthusiastic collector of prints of medical men.

The prize essay 'The Causes of Appendicitis' by F. C. Bottomley, M.D., Physician to the Boscombe Hospital, is followed by a paper 'The Causation and Treatment of Appendicitis' by James Sherren, F.R.C.S., Assistant Surgeon to the London Hospital, according to whom it is worth considering 'whether the increasing consumption of chilled and frozen meat, and of the much-advertised partly cooked cereal foods, plays any part in the production of this increase' in the number of cases treated. Influenza, he thinks, has some share in the production of 'the peculiar fluctuations in the increase'. The ideal treatment 'is to remove the appendix during the first 24 or 36 hours of an attack, if this is impossible, expectant treatment should be adopted, being ready to operate if the patient does not steadily improve'. James Sherren (1872-1945) at an early age served before the mast, but after obtaining his master mariner's certificate became a medical student at The London. He was appointed assistant surgeon in 1902 and full surgeon in 1913. In 1926, at the very height of his surgical fame and success, he resigned and went back to his first love—the sea.

The first article of a new series 'British Health Resorts' deals with Harrogate, and 'By-Paths of Medicine' discusses 'The Evolution of the Apothecary'.

'Reviews of Books' contain a nostalgic note:—'We must commend the enterprise of the publisher' of J. McFarland's 'Textbook of Pathology' (350 illus.) 'in bringing out so large and well-got-up a volume at so moderate a price' (21s.).

W.R.B.

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